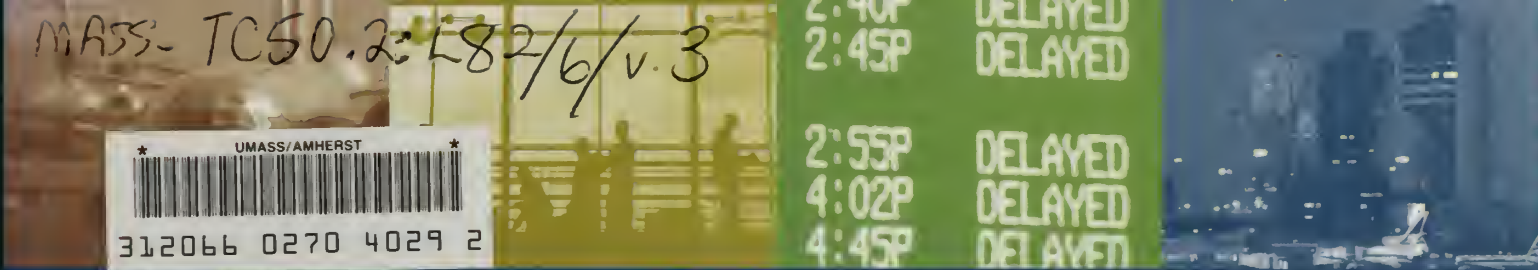

Supplemental Draft Environmental Impact Statement/Final Environmental Impact Report

EOEA #10458

Logan Airside Improvements Planning Project

Boston
Logan
International
Airport

massport Massachusetts Port Authority

Federal Aviation Administration

Appendices
Volume 3

Supplemental Draft Environmental Impact Statement/
Final Environmental Impact Report

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March 2001

Appendices **Volume 3**

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Appendix A
FAA Supplemental Draft EIS
Panel Process

Federal Aviation Administration
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February 9, 2001

Ms. Betty Desrosiers
Massport Authority
Logan Office Center
One Harborside Drive
Suite 200 So. - 2nd Fl.
East Boston, MA 02128

Ms. Deborah Meehan
President & Chief Operating Officer
Simat, Helliesen & Eichner, Inc.
One Main Street - Fifth Fl.
Cambridge, MA 02142

Re: Analytic Tasks for Logan Airside Improvement Project Supplemental Draft EIS

Dear Betty and Deborah:

I have enclosed a document entitled "Additional Analysis for the Logan Airside SDEIS" which constitutes a description of the additional analysis that should be incorporated into the Supplemental Draft Environmental Impact Statement ("SDEIS") for the Logan Airside Improvement Project. The SDEIS will be the next formal submission made by FAA in respect to FAA's ongoing review of the Logan Airside Improvement Project under the National Environmental Protection Act and related FAA requirements. (FAA is also the project proponent with respect to certain elements of the Preferred Alternative – i.e., the reduction in approach minimums on runways 22L, 27, 15R and 33L). The enclosed document has been finalized by FAA following discussion of earlier drafts with the SDEIS Panel, described below, and is intended as our directive concerning specific items identified as a result of the SDEIS Panel process that are to be included in the SDEIS.

The SDEIS was required as a result of a determination by Administrator Jane Garvey in January 2000. As part of this determination, Administrator Garvey asked for the formation of a special panel (the "SDEIS Panel") consisting of six members, three of whom would be appointed by Governor Cellucci (Lieutentant Governor Jane Swift, Mr. Richard Egan and Mr. John Butler) and three of whom would be appointed by Mayor Menino (State Representative Byron Rushing,

Ms. Mary Ellen Welsh, and Mr. Raymond Tye). The SDEIS Panel met over a ten month period (March – December 2000). In my judgement, the process was substantive and involved review of analysis produced by Massport and the FAA with respect to the Project EIS process to date, presentations by various technical experts, comments from members of the public attending the SDEIS Panel meetings, and the active participation through numerous insightful inquiries, suggestions and comments from the individual SDEIS Panel members. Both FAA and the SDEIS Panel members also had the benefit of consultation with a special independent expert to the Panel hired by FAA in response to a Panel request. All of this work provided FAA with context for developing the enclosed list of analytic tasks and other materials to be included in the SDEIS. The panel process also assisted in identifying tasks that may be included in a subsequent new Regional Airports System Study.

In addition to providing the analysis and other materials specified in the enclosed document, a copy of the minutes of the various SDEIS Panel meetings as well as a copy of this letter and enclosed document must be a part of the SDEIS submission. We believe that it would be beneficial for SDEIS reviewers to have available to them the record of the SDEIS Panel process and the results of that process which appear in the form of the enclosed list of specific analytic tasks.

On behalf of Administrator Jane Garvey and all of us at FAA who had the benefit of their participation, I want to reiterate our gratitude for the extraordinary dedication and assistance of the individual SDEIS Panel members throughout the process. Their contribution to FAA's deliberations and to the public review process for this Project is evidenced by the substantive content of the list of analytic tasks developed as a result of their input.

Sincerely,

Vincent A. Scarano
Manager
Airports Division

cc: Administrator Jane Garvey
Members of the SDEIS Panel
Mr. James Muldoon
Ms. Suzanne Orenstein

ADDITIONAL ANALYSES FOR THE LOGAN AIRSIDE SUPPLEMENTAL DRAFT EIS

Task	Task Description

1.0 Is a 5,000 ft Runway 14/32 effective given the expected use of regional jets in the future fleet mix? (To be performed by FAA consultant)

1.1 Verify and confirm previous survey of airlines and manufacturers to determine minimum arriving /takeoff distances for regional jet aircraft.

1.2 Research regional jet aircraft usage and runway length requirements at other airports.

1.3 Review forecast mix of regional jet aircraft types at Logan.

1.4 Develop estimate of probable regional jet utilization of a 5,000 ft. Runway 14/32.

2.0 Expand Regionalization analysis contained in Interim Supplemental Draft EIS ("Brown Book")

2.1 Discuss proposed New England Regional Aviation System Study and proposed work scope.

2.2 Update to reflect the current status of traffic and services at the regional airports, Amtrak's Acela service, and ground access projects.

2.3 Add historical context and on-going nature of regionalization efforts.

3.0 Expand analysis of peak period pricing.

3.1 Review changes in airline scheduling activity at Logan and assess how and why the demand profile has flattened over time.

3.1.1 Determine which new airline/markets have contributed to changes in the demand profile.

3.1.2 Assess whether the flattened profile or a more peaked profile is likely to occur in the new future fleet (2015 Modified 37.5M RJ fleet).

3.2 Discuss the design of a Peak Period Pricing program that would impact regional jet scheduling practices at Logan.

3.2.1 Base analysis on modified 2015 Modified 37.5M RJ fleet, using an updated demand profile and a small community exemption program.

3.2.2 Discuss the economic cost of peak period pricing to the consumer.

3.2.3 Discuss the uniqueness of Cape Air and the communities that it serves.

3.3 Identify known, comparable demand management strategies that are in use or have been proposed by other airports.

4.0 What impact does the 2015 Modified 37.5M RJ fleet mix have on delay reduction benefits and environmental impacts?

4.1 Develop 2015 fleet mix and demand profile assuming 37.5M passengers and increased RJ utilization.

4.2 Assess the impacts of the new fleet on delays, runway utilization, noise contours and noise-exposed populations for Alternatives 1, 1A, 2, 3 and 4.

4.3 Assess the impacts of the new fleet on ground noise and air quality for Alternatives 1/1A and 4.

4.4 Perform delay sensitivity analysis using varying RJ utilization factor for Runway 14/32.

5.0 Broaden discussion of national delays to put Logan delays into context.

5.1 Assess Logan's relative national delay ranking if Runway 14/32 was available in 1998.

5.2 Discuss how delays at Logan affect the national air transportation system.

5.3 Discuss measures FAA is pursuing to reduce delays nation-wide.

6.0 Analyze potential wind/weather use restrictions on Runway 14/32 and their impact on delay reduction, runway utilization, and PRAS achievement.

6.1 For the 2015 Modified 37.5M RJ fleet, analyze and compare delay levels and runway utilization patterns for: (1) No Action, (2) Action [a.] As Modeled with PRAS and [b.] with wind/weather restrictions on the usage of Runway 14/32.

6.2 Determine impact of potential restrictions on utilization of Runways 27 and 33 for departures, PRAS achievement, and ability to reduce population exposed to the highest noise levels

7.0 Present enhanced flight track graphics on the same GIS base map used for the Brown Book noise contours, show individual tracks, extend into the South Shore, and show altitudes.

8.0 Incorporate a summary of existing analyses from the Draft EIS for Alternatives 1, 2, and 3 into the SDEIS in addition to the No Action (Alt. 4) and Preferred Alternative (Alt. 1A).

9.0 Analyze the potential for proposed infrastructure improvements (Runway 14/32 and taxiway improvements) and Peak Period Pricing to induce demand for Logan Airport.

10.0 Compare current measured noise levels from monitors in residential neighborhoods to modeled results from the Integrated Noise Model (INM).

11.0 Address the following specific issues for which clarification has been requested:

11.1 Provide data and discussion on predicted change in activity by runway end, including daytime and nighttime distribution.

11.2 Clarify discussion of proposed Centerfield Taxiway and its impact on the number of aircraft queuing on that taxiway and other taxiways waiting to depart.

11.3 Respond to written questions submitted by SDEIS Panel member, Mary Ellen Welch

12.0 Produce a school year/school day 65 dB contour for the Preferred Alternative for the 29M Low fleet. Research school day operating hours in relevant surrounding communities to determine the appropriate hours for the analysis.

SDEIS Panel Minutes

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
December 4, 2000

I. Participants: All Panelists were present.

II. Discussion

Opening Remarks
- The meeting opened at 4:08 PM. The facilitator noted that this was the final scheduled meeting for the Panel.
- Ms. Orenstein reviewed the agenda and asked for comments on the minutes for the November 13 and 28 meetings. The minutes were finalized and accepted for distribution and posting on the web site. The minutes for this final meeting will be distributed to panelists for comment, and will be finalized after any comments are received.

Overview of Logan Airport's Role in Future Coordinated Regional Airport System
- Mr. Scarano introduced Virginia Buckingham, Executive Director and CEO of Massport, who discussed the vision for Logan Airport's future with the Panel. She noted that Logan's primary focus for the future will be on long-haul and international service. She noted measures Logan is implementing to prepare for that role, including:
  - Renovation of the international Terminal E;
  - Replacement of Terminal A;
  - New west parking garage and elevated walkways to all terminals;
  - Improved ground access, including greater use of HOVs, a fourth remote location for Logan Express in the north for the Rte.1/95/128 area, remote baggage check-in, HOV improvements to Cape Cod, a new Blue Line Station, and Logan Dart service to South Station, which expects to serve 60,000 riders this year.
- Ms. Buckingham discussed Logan's role in promoting a regional airport system, noting that Logan will serve only 30% of the new passengers in the future. She noted that Massport manages two other airports in the region, Worcester and Hanscom, and spoke about plans for improving the success at Worcester. Worcester has the capacity to serve 800,000 passengers. Its highest passenger year was 1989, when it served about 380,000 passengers. In 1999, Worcester served around 50,000 passengers, but with improvements in service, this year it has already served 100,000 fliers. Regarding Hanscom, she noted that it would continue as the region's largest general aviation airport, with some niche commercial service.
- Ms. Buckingham noted that Massport hopes that the new Acela train service will be able to take 40% of Logan's New York shuttle traffic.
- Ms. Buckingham noted that the New England governors were addressing air transportation as part of the second transportation conference coming up next week. Lt. Governor Swift distributed invitations to the summit to all Panelists.

- Question: Mr. Tye asked what percent of Logan's traffic is considered short-haul.
- Answer: About one-third.

- Question: Lt. Governor Swift asked how Ms. Buckingham viewed Massport's role in achieving regional airport growth and multi-modalism.
- Answer: Ms. Buckingham spoke about creating incentives for greater regional airport use and for promoting the growth of other airports in discussions with airlines.

- Question: Lt. Governor Swift asked how Massport was addressing issues of reliability at Worcester Airport.
- Answer: Cancellation levels for Worcester weather have been low. However, there is a perception that Worcester is not reliable, which needs to be corrected. Massport is considering whether technology improvements at Worcester will improve reliability.

- Question: Mr. Tye asked why a new runway is needed if Logan wants to be an international, long-haul airport.
- Answer: Delays in NW winds affect all passengers, and need to be eliminated. Also, Logan will always need smaller planes to feed connecting passengers to the long-haul flights.

- Comment: Ms. Welch noted that a true regional approach should mean fewer small aircraft, and with Acela service and the number of days NW winds are a problem, the new runway is not needed. Ms. Welch noted that FAA and Massport are taking a giant step in working towards true regionalization, but suggested that demand management strategies should be tried and evaluated prior to building a runway.

- Question: Rep. Rushing asked about other types of operations that could be reduced at Logan.
- Answer: Massport is trying to move charter flights to other airports, but is being challenged on the grounds that it would be discriminatory. They are also looking at moving cargo operations, but since about 60% of cargo arrives in passenger planes, Logan will always need some cargo moving capability. Massport is also looking at changes in general aviation facilities that may decrease the desirability of flying into Logan for general aviation, and they are discussing changes in Fed Ex and UPS operations.

- Comment: Ms. Welch asked if anything could be done to improve bottlenecks on Routes 1 and 1A north. She also noted that a new truck route recently funded by state transportation officials would improve truck traffic.

- Ms. Buckingham thanked the Panelists for their work on the SDEIS and noted the need to get a resolution on the runway issue. Mr. Scarano and the Panelists thanked Ms. Buckingham for her presentation.

Review of List of Potential Additional Analyses

The Panel reviewed the revised list of Potential Additional Analyses and made the following suggestions. (*Denotes an item on which significant disagreement was expressed. +Denotes an item on which there was agreement among panelists.)

Item	Suggestion
1	-Include info re: New Haven where regional jets are requiring 7000 ft. RW
2	-Add Amtrak, buslines, and highway improvements to second bullet -Incorporate forecasts and info from master plans for Manchester and T.F. Green +Update Brown Book Chapter 2 re: regionalization
3	-Analyze 2010 modified 34 million passengers as part of A, bullet 2 -Analyze 2010 fleet for 34 million passengers as part B, bullet 1 +Add uniqueness of Cape Air and communities it serves to B, bullet 3 +For section C, look at all known, comparable, demand management strategies in use or proposed at other airports
4	No suggestions
5	-Restore the deleted task of estimating the cost of total delays, not just Logan-caused delays -Determine and state Logan's relative rankings nationally among airports for delays if the runway is built. Assumptions, parameters, factors held constant to make this analysis feasible would need to be determined (e.g. assume other airports do not improve). Determine this for each alternative for one year, five years, and ten years out. -Discuss how delays at Logan affect the national air transportation system, and how delays in the national system affect Logan
6	*Add: PRAS should not be factored into analysis until it is updated
7	No suggestions
8	*Analysis should consider feasibility and changes that would be required to implement change in first come-first serve. (Other view was to drop this item)
9	No suggestions
10	*Determine maximum growth capacity and limitations at Logan, including looking at current growth rate and determining and stating in document the capacity of the airport in operations per year
11	-Change wording to "Compare current measured noise levels..."

12 -In bullet one, consider eliminating the study of the operational capacity of a single runway configuration

13 -Add to bullet 3: "queuing on that taxiway and other taxiways..."
-Discuss whether FAA standards will be waived for the safety areas - bullet 1

14 +Confirm that hours for school-day noise contour are from 7 AM to 4 PM

Additional Item: Reconsider geographic component of EJ analysis.

Mr. Rushing requested that the Panel be provided with the revised list of additional analyses. Ms. Orenstein noted that it would be provided.

Schedule for Moving Forward

- Mr. Egan asked that the schedule for moving forward with the SDEIS be outlined. The following schedule was projected.

Studies	Through mid-February
SDEIS out to public and Panel	First week in March
Public Comment Period	Through April 15
MEPA Certificate	April 22 (seven days after close of public comment)
FEIS	May 30

- The question of whether the Panel should meet at some point to review the draft SDEIS was not resolved. Some felt the disagreements would not be resolved, so it was not necessary to meet. Other felt that meeting might help to narrow some of the disagreements among Panel members. It was left that the Panel might be invited by the FAA to meet and review either the draft or the public comments on the draft, but that it was not certain that this would happen.

Panel Input on Regional Air Study and Other Intermodal Planning Efforts

- Mr. Scarano talked about the new Regional airport study, noting that it would take 12-18 months to complete and would reflect a rapidly changing environment.
- The Panel provided the following suggestions.
  - Recognize the need for on-going, always-making-progress effort.
  - Speculate about unconstrained possibilities, to be as comprehensive and forward thinking as possible.
  - Identify information from the previous plan (1995) that was most useful in predicting and reacting to growth, (e.g. route analysis) and place a priority on updating that information.
  - Consider ground access factors, including Routes 1 and 1A north near airport.

- Include all New England airports, perhaps in two categories of closer in to Boston and a broader range of secondary airports, like Portland, Bradley, New Haven, etc. Pease Airport should definitely be part of the analysis.
- Look at improving train routes throughout New England, not just New York to Boston.
- Factor in how noise abatement projects for all airports and train routes could be used to reduce resistance from neighbors.
- Look at and propose the level of leadership that will be required to do both air and intermodal coordination on an interstate level.
- Look at barriers that will prevent coordination and how to address them.

III. Public Comment

Dan Wolf of Cape Air said that Cape Cod communities want environmental and roadway impacts looked at if air service to the Cape was going to be curtailed through the implementation of Peak Period Pricing. He also asked whether the road system to Logan could accommodate a move toward more high-occupancy aircraft.

John Marcy of Winthrop addressed the Panel about air quality impacts from the airport. He noted that Chapter 6 of the SDEIS should reflect issues with particulate emissions, as noted in the preliminary Winthrop health effects survey.

Anastasia Lyman, Co-chair of the CAC, asked if the noise contours in the SDEIS would be the same as in the Brown Book. The response was that SDEIS would include the 1998 contour base case, with a new 2015 contour. Ms. Lyman also thanked the FAA for opening up the Panel process to the CAC and the public.

IV. Closing Comments

- Mr. Scarano thanked the Panel members for their hard work and said he believed that FAA's expectations were met. He noted that the Panel had accomplished all it was asked to do, and had been very understanding of the need for additional meetings and discussion. He said he was aware that some of the public's expectations may not have been met, but he noted that he was satisfied with the efforts to include the views of the CAC, the EPA, and experts from outside the Massport consultant pool. He noted FAA's response to some of the public comments in the hiring of Jim Muldoon as the independent technical expert, and in the opening of the meeting to observers and their comments. He thanked all involved for their cooperation and contributions. (The outline of Mr. Scarano's comments is attached.)
- Mr. Butler thanked Mr. Scarano and Ms. Orenstein for helping to achieve a balanced discussion process.

V. The meeting adjourned at 6:50 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
November 28, 2000

I. **Participants:** All Panelists were present.

II. **Discussion**

Opening Remarks
- The meeting convene at 4:07 PM.
- Ms. Orenstein noted that this meeting was the second to the last in this Phase of the Panel's work. The final meeting for this Phase is Monday, December 4.
- The agenda for this meeting was reviewed, with the addition of a representative from Winthrop's Health Action Committee to the section on Air Quality.
- Mr. Scarano apologized for the delay in circulating the minutes from November 13. He asked that Panelists review them prior to the next meeting.

Presentation and Discussion of Air Quality Impacts from the Airside Improvements Project
- Mike Kenney from URS, the consultant who conducted the air quality analysis for the Draft EIS, presented an overview of the AQ findings.
  - He explained that his study covered emission levels of criteria pollutants, dispersion modeling of the emissions, and comparisons with the allowable levels. The study found no expected violations and the lowest emission levels with Alternatives 1 and 1A. One factor in the results is that as airport equipment and operations become more efficient, pollutant emissions will be reduced.
- Mr. Tye asked what pollution might one expect without the airside improvements. Mr. Kenney explained that the results would be the same. He further explained in response to a request for clarification from Ms. Welch that while the airport is a proportionally greater contributor of pollutants to those who live next to it, it is still small by comparison with other nearby sources of pollution such as roadways and toll booths.
- Ms. Welch stated that odor and soot are obvious problems for airport abutters, and it was hard to believe that the airport was not raising the levels of those pollutants for its neighbors and that that these pollutants would not increase with increasing operations at the airport. Mr. Kenney noted that for most studies around airports it has been impossible to separate out airport emissions from all other urban air pollution sources. When Ms. Welch asked about the soot study conducted at Logan several years ago, Mr. Kenney noted that it was unable to link soot to specific sources.
- Mr. Egan noted that the proposed improvements at Logan were designed to increase efficiency and that the fewest expected emissions were from Alternative 1/1A, which includes the runway.
- Mr. Brian Dumser, a member of Winthrop's Health Action Committee, presented the findings of a study of Winthrop residents in two Winthrop neighborhoods that varied in their proximity to the airport. The study showed that there were twice as many

diagnosed cases of asthma and respiratory disease in the neighborhood closest to the airport. Mr. Dumser presented the results as the communities effort to begin to understand air quality impacts, noting that further, more rigorous study is needed and may be undertaken by the MA Dept. of Public Health.

- Mr. Egan asked Mr. Dumser if he would welcome measures that would decrease pollution from the airport. Mr. Dumser said he would.
- Mr. Nicosia-Rusin asked whether, if one accepts that there is an increased rate of respiratory disease resulting from higher airport emissions, would it be reasonable to expect the incidence of disease to decline as aircraft pollutants decrease. Mr. Dumser responded that it is unclear what elements of aircraft pollution are tied to disease, and specifically questioned the role of particulate emissions.
- Ms. Meehan asked if Mr. Dumser would agree that if the preferred alternative reduced pollution and there was no induced demand increasing it, that the airside improvements could be desirable in terms of health concerns. Mr. Dumser did not feel that there was sufficient data about any of the projects to state any view conclusively.
- Ms. Welch noted that a health study is needed, citing the proximity of the Court Road neighborhood to the sources of pollution. She noted that better data on the health impacts of the airport on surrounding neighborhoods are needed. Other panelists agreed that health effects data were needed, but some noted that health effects studies should not be tied to the airside improvements project, because it was an issue for the airport as a whole.

<u>Overview and Discussion of Mitigation Proposals in the DEIS</u>

- Deborah Meehan of S, H & E presented an overview of the mitigation proposed in the DEIS. She noted the following proposed elements of the mitigation package.
  - Commitment to unidirectionality as a noise abatement factor,
  - Sound insulation of the impacted area, particularly in Chelsea,
  - Moving the upland sandpiper off-site, including habitat enhancement,
  - Increased PRAS monitoring and reporting,
  - A Peak Period pricing monitoring program,
  - Over-water nighttime preference as part of PRAS,
  - Voluntary reductions in the use of hush-kitted aircraft, and
  - Promotion of regional airports and alternative transportation modes.
- Several Panelists asked questions about the soundproofing program. Mr. Silva explained that accomplishing the soundproofing as part of this project would result in quicker action for the affected homes than if they were part of Logan's on-going program. He also noted that FAA has agreed to bring homes up to code if necessary to accomplish the soundproofing, which is an unusual step. Mr. Egan asked what the average cost of soundproofing would be per house, and Mr. Silva noted it could be about $30,000 each. Mr. Egan noted that the total cost would be over $30 million.
- Other mitigation ideas proposed by the panelists included:
  - Is a "harbor mouth" approach a potential mitigation for RW 14-32 traffic? Also for increased approaches on RW33?

- Could a sharper left turn off RW 22, keeping track over water, help mitigate noise? Feasibility of this? [Mr. Butler noted this would put planes on directly intersecting paths.]
- What RW 14-32 impacts is unidirectionality mitigating?
- Need to reassess PRAS with community. Need to add today's airport procedures to system.
- Are there any schools that should be added within the 65 school year, school day DNL?

- Ms. Welch asked whether PRAS would be reevaluated as part of the Supplemental Analysis or as a mitigation measure. She accepted that this item was part of the mitigation effort.

Outline of Mechanisms for Unidirectionality Commitments

- Richard Littieri of Ropes and Gray described three levels of potential commitments to unidirectionality.
  - *Operational commitments* include the Hyatt Hotel as an obstruction, the striping and lighting of the runway for unidirectional use, the lack of a taxiway for bi-directional use, and establishment of ATC procedures for unidirectionality only.
  - *Administrative or Regulatory commitments* would result from the fact that the project would only be permitted for unidirectional use.
  - *Contractual commitments* could be accomplished by an enforceable contract with the communities or by a negotiated agreement that the current injunction would continue to be in force for all operations other than the unidirectional operations.
- Ms. Welch asked how often Records of Decision have been overturned or violated. FAA responded that the EIS process would have to be repeated if the ROD were changed.
- Mr. Egan asked if all Panelists were satisfied that unidirectionality could be guaranteed. Ms. Welch responded that she has seen other agreements unfulfilled, and was not yet convinced on this issue.
- Lt. Governor Swift asked if commitments on all three levels would help make the communities more confident in the promise of unidirectionality. Ms. Welch noted that the communities would have to consider and discuss that.
- Mr. Rushing asked what impacts are being mitigated by unidirectionality. He suggested that this question be addressed in the Supplemental Analysis.

Review of Revised List of Additional Analysis Items for SDEIS

The Panel reviewed the revised list of potential items for analysis in the SDEIS; this version incorporated the comments from the Panel's discussion at the last meeting.

- Lt. Governor Swift suggested clarifying the section on PPP to incorporate special circumstances for unique communities and airlines.
- Mr. Rushing asked that the list be left open for discussion and additions until the Dec. 4 meeting, as had been previously agreed. Lt. Governor Swift asked for advance notice of any suggested additions so that Panelists could be prepared to address them, given that the Dec. 4 meeting was the last meeting. Panelists agreed to provide advance notice of any proposed items if at all possible.

III. Public Comment

Dan Wolf, President of Cape Air, said that a peak period pricing program would have the biggest impact on the user, Cape Air, with the least impact on delays. He mentioned that it could put 500 people out of work. He concluded that it was not a good technical solution, but that it may be discussed as a political solution for addressing runway opponents concerns. He asked that other avenues be sought for the political purpose.

Blossom Hoag of the Sierra Club asked about how the RW14-32 operations would accommodate missed approaches, given the obstruction of the hotel. She also spoke in favor of improving rail links to the north, and noted her dissatisfaction with the fact that substantive Panel discussions were cut off prematurely.

At the end of the public comment session, Ms. Welch responded that Cape Air is a special situation for the Peak Period Pricing option, and that the CAC feels that there should be exemptions for Cape Air in any PPP proposal.

IV. Planning for Next Meeting

Mr. Scarano suggested that the next meeting be devoted to doing a final review of the List of Items for Additional Analysis in the SDEIS, and also that he would appreciate Panelist input on the proposed Regional Air Study and other regional intermodal transportation initiatives. The Panelists agreed to this agenda. Mr. Scarano also distributed copies of an article from Boston Magazine about the Accela train service.

Mr. Tye asked that as part of the discussion of regionalizing air transportation, Massport present its vision for Logan's future. Ms. Meehan noted that Chapter 2 of the Brown Book presents quite a bit of information about Logan's role in the regional system, but that she would like to hear how that Chapter could be improved. The Panel accepted the idea of a presentation from Massport.

The next meeting will be on December 4, 4:00 to 7:00 PM, at the Volpe Transportation Center, 55 Broadway, Cambridge.

The meeting adjourned at 7:00 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
November 13, 2000

I. Agenda (See attached)

II. Participation: Mr. Tye was unable to attend.

III. Discussion

Opening Remarks and Review of Agenda and Minutes

- The Panel convened at 3:31 pm.
- Ms. Orenstein said that the major topic of the meeting would be a review of FAA's working draft of additional work for the SDEIS.
- Mr. Scarano noted that a letter from EPA, Ms. Welch's questions, and a letter from Cape Air were distributed to the Panel. He also noted that the Working Draft of areas of potential additional analysis, distributed to the Panel, represent FAA's thinking to date and that the additional analysis doesn't appear to change the schedule for publication of the SDEIS.
- The Panel introduced themselves for the benefit of the public.
- Ms. Orenstein asked for comments to the minutes of 10/10 and 10/12. There were none and the Panel accepted them with the understanding that they would be published on the web site.

Introduction to List of Items for SDEIS Analysis

- Mr. Scarano referred to those additional analysis areas where work had already begun.
    - Mr. Muldoon, consultant to the Panel, updated the Panel on Item 1 of the List of Additional Analyses (analysis of regional jet use of RW 14-32), saying that turbo-prop forecasts were down and regional jet forecasts were up.
    - Mr. Egan clarified that 3 of the 4 Regional Jet aircraft could use the proposed 5,000-foot runway. Mr. Muldoon added that actually all four could technically use it but the commitment was not as certain for the Challenger aircraft.
    - Mr. Hollander of SH&E stated that runway length vs. aircraft use would be assessed. He added that there were benefits even if three of the four aircraft could use the runway. Mr. Butler reiterated this.
    - Ms. Welch said that even if the aircraft were capable, some carriers might decide not to use the runway. She asked if a comparison would be made to other airports, including an analysis of the effect of the hotel as an obstacle. Mr. Butler responded that FAA would consider the appropriate missed approach altitude for Runway 32.
    - Mr. Scarano mentioned that analysis of the runway safety area would reflect Ms. Welch's concerns with landings on Runway 32.
    - Lt. Gov. Swift said that the analysis should look at the impact on safety from the proposed runway.

- Mr. Scarano addressed Item 2, "regionalization", particularly additional work on a separate study to look at other airports and transportation modes and their capability to reduce traffic at Logan. He said that a Scope of Work should be ready by early spring. Lt. Gov. Swift added that this effort needs to be undertaken within the context of regional study work already conducted.
  - Ms. Welch asked if telecommunications would be included. Mr. Scarano responded that it would.
  - Mr. Egan wanted assurance that this additional work would not delay the SDEIS. Mr. Scarano responded that since the regional study might take two years, there was no intent to hold up processing the SDEIS.
  - Lt. Gov. Swift said that the study would have value as a tool for the future.
  - Mr. Welch said it was important to get a regional plan in place prior to completing the SDEIS.
  - Lt. Gov. Swift said that there needs to be a commitment to regional planning as part of the EIS process.
  - Mr. Nicosia-Rusin said that the rationale for the runway is contained within the SDEIS and is not affected by the results of "regionalization".
  - Rep. Rushing requested an analysis of why "regionalization" is not a substitute for the new runway.
- Mr. Hollander began a discussion of Item 3, demand profile. Lt. Gov. Swift suggested it be combined with Item 4, peak-period pricing. There was agreement to combine all demand management sections.
  - Mr. Hollander said that a broader peak-period pricing program over a greater number of hours would be assessed.
  - Ms. Welch wanted to know if LaGuardia and San Francisco proposals to deal with congestion would be addressed. Mr. Hollander responded that they would.
  - Mr. Hollander spoke about price elasticity with relation to demand.
  - Lt. Gov. Swift wanted to know how peak-period pricing would affect other major markets and would like to see a benefit-cost analysis of its impact on consumers.
  - Discussion continued over designing a peak-period price that would be feasible.
- Mr. Hollander continued with Item 5, an assessment of the 2015 Regional Jet fleet and its affect on delay reduction and environmental impact, and Item 6, a broader discussion of delays to include the interface of other airports.
  - Rep. Rushing asked what position Logan would place in delays after a Runway 14-32 was constructed. Mr. Egan and Mr. Butler questioned the value of studying this, explaining that all airports could improve, thereby maintaining the same relative rankings.
  - Ms. Welch said that the cost of delays included all delays and not necessarily those associated with the runway. Mr. Hollander clarified that the delay data was only related to Logan delays, not delays from other airports.
- Regarding Item 7, potential restriction of the use of Runway 14-32, Ms. Welch asked if Runway 15L-33R could be encouraged more.
  - Mr. Hollander, Mr. Scarano, and Mr. Davies of the Tower spoke about the interrelationship of both of the 15-33 runways.

- Regarding Item 8, demand management at other airports, Mr. Hollander discussed LaGuardia and recent efforts for a temporary lottery followed by a more permanent pricing program.
  - Ms. Welch spoke about the need to consider peak-period pricing sequentially--implement it first, then assess its effect. Discussion followed on the degree to which this was already included in the Brown Book.
- Mr. Scarano mentioned Item 9, a better graphics depiction of noise.
- Mr. Hollander went over Item 10, modifying first-come, first-serve air traffic control procedures to see what affect it would have. After some discussion among Panel members, Mr. Rushing argued that if it had a benefit, an explanation of what it would take to implement it should be included.
  - Mr. Scarano added that the measure might not have an effect in delay reduction.
  - Mr. Butler said that safety of the measure would preclude it and objected to including it in the List of Additional Analyses.
  - Mr. Egan felt it could be logically dismissed, once the effect was known, because of its impracticality.
- There was agreement on Item 11, the need to combine the original DEIS with the SDEIS and produce one document. Mr. Silva mentioned that this would make processing simpler by avoiding the need to republish the original DEIS.
- Regarding Item 12, potential induced demand of the proposed improvements, Ms. Welch said it was important to know if the improvements would create new demand.
  - Rep. Rushing said that if additional demand were anticipated it would be important to know the extent that this would have on making a decision to go forward with the Runway now.
  - Mr. Scarano responded that the benefit of the runway in delay reduction would always be present.
- Mr. Hollander addressed Item 13, measured versus modeled noise, saying that recent information comparing the two would be included in the SDEIS.
- Regarding Item 14, the level of operations that would not produce delay benefits, Mr. Egan and others noted the impracticality of achieving this if it were studied. Lt. Gov. Swift recommended that, once a level of operations was determined, we look at when it occurred historically and other benchmarks of activity such as airline prices, etc.
- Regarding Item 15, which includes additional discussion of the centerfield taxiway, there was expression of the need to clarify the runway and centerfield taxiway layout.
- Mr. Rushing mentioned an additional area, the comparison of Environmental Justice populations. Mr. Scarano noted that this was a subject under discussion with EPA. Mr. Silva added that it might be precluded from additional analysis as a result of ongoing discussion.

<u>FAA Response to Questions Raised at the Panel Meeting of 10/12/00 Related to Reductions in Landing Minimums</u>

- Following a 15-minute break, Mr. Davies addressed questions from the 10/12/00 meeting about reductions in minimums. He explained the descent profile to an airport, specific examples for Logan's runways, and the benefits of reduced minimums. The benefits include having the missed approach point closer to the runway and more distant from the community, fewer missed approaches, having runways other than 4R to conduct

approaches in poor visibility, and better compliance with the Preferential Runway Advisory System.

- As part of discussion of Mr. Davies presentation, Mr. Silva explained the history of the FAA agreement with Massport to first do an EIS before reducing minimums. Mr. Nicosia-Rusin added that normally reductions in minimums would require only a Categorical Exclusion (from the need to provide an environmental assessment).
- Ms. Welch addressed community concern with safety as aircraft descend lower.

IV. Observer Comments

- Ms. Anastasia Lyman of the Community Advisory Committee referred to a recent EPA letter on the SDEIS process and discussed induced demand, the cost-of-delay data that needs to be compared with the cost of environmental impact, and a question about the degree of design that has occurred. Mr. Nicosia-Rusin explained that design has not progressed to any substantial detail.
- Mr. Dan Wolf of Cape Air spoke to peak-period pricing. He said that Cape Air does not have the option to go to larger aircraft because of the need to adjust to seasonal demand. He also doubted that peak-period pricing would be effective for very long. Finally, he said that Cape Air presently fills in the holes in runway availability, and is not a factor in Logan delays.
- Dave Kresge of Chelsea did not believe that FAA should be determining whom aircraft would be flying over. He also objected to the delay statistics and no representation on the Panel from Chelsea.

V. Planning for Meeting of November 28, 2000

- Ms. Orenstein went over potential agenda items for the next meeting.
- Mr. Rushing asked if this evening's comments could be integrated into the List of Additional Analyses prior to the next meeting (11/27).
- There was a brief discussion of environmental mitigation. Rep. Rushing reiterated his concern about Environmental Justice and the population comparisons.
- Ms. Orenstein went over the agenda for the next meeting on 11/28/00: air quality, mitigation, unidirectional runway commitment, and a review of a revised list of additional work analysis.

VI. The meeting adjourned at 6:00 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
October 10, 2000

I. Agenda (See attached)

II. Participants: Mr. Butler was unable to attend.

III. Discussion

Opening Remarks, Review of Minutes, Updates

- Ms. Orenstein opened the meeting at 3:08 p.m., going over the agenda: noise and environmental justice for this meeting and a continuation of Environmental Justice and Preferential Runway Advisory System (PRAS) at the 10/12 meeting (In addition to a trip to the Tower to observe PRAS).
- Mr. Scarano said FAA has been looking into 3 issues: use of Runway 14-32 by the regional jet (RJ) fleet, impact of the RJ s on fleet mix, and the regional airport system.
- Lt. Gov. Swift suggested that FAA begin to revise the Brown Book without waiting for all Panel deliberations to be completed.
- Mr. Scarano said all additional work items, as determined by the FAA, will be presented at the 11/13 meeting.
- Mr. Egan asked how long the process would go after Nov. 13th. Mr. Scarano responded that the Brown Book would be revised in about 3 months, followed by a 45-day comment period on the SDEIS, then at least 30 days before o FEIS and another 30 days to produce a record of decision. Lt. Gov. Swift again suggested that the initial 3-month analytic period might be shortened if FAA directs the consultant to begin some work now.
- Mr. Rushing said he was interested in the format for additional work. He added that he believed there might be agreement on many of the items for additional study. Mr. Scarano said he would make the list available for the Nov.13th meeting.
- In response to a question from Mr. Tye, Mr. Scarano explained that, in addition to the SDEIS, an additional regional systems study will be done. The SDEIS will rely on systems planning work already accomplished. Mr. Scarano also said the SDEIS would go further than the Brown Book in this area.
- Ms. Meehan suggested that we stop making presentations. She needs to know more of what the Panel thinks. Mr. Tye responded that the presentations are part of education. Ms. Orenstein said that additional emphasis would be placed on Panel discussion time.
- Comments on the minutes of the 9/27/00 meeting: Mr. Egan noted Mr. Odoni's response to an observer comment. Mr. Odoni felt he was misquoted.

Noise Questions

- Mr. Miller began a discussion of noise questions which came out of the previous meeting (see agenda and handout). He went over factors affecting average day-night

sound levels (maximum sound level, duration, the number of events, and how many occur between 10pm and 7am). He went over additional metrics: maximum sound level, sound exposure level, equivalent sound level, and time above threshold sound levels. He said that they were used in the EIS.

- In response to what other airports have done to address impacts, Mr. Miller discussed flight corridors, preferential runway use, noise barriers and run-up enclosures, sound insulation of homes, noise abatement departure procedures, and voluntary and mandatory access restrictions.
- In response to the specific noise impacts of the centerfield taxiway, Mr. Miller explained that over-flight noise was dominant but that modest improvements in taxiway noise were achievable by relocating some taxiing aircraft further from the corners of the airport. Ms. Welch noted that Taxiway N would still be used. In response to a question from Lt. Gov. Swift, Mr. Miller explained a worst-propagation scenario that shows noise reduction with the centerfield taxiway. Ms. Welch argued against DNL by stating that averaging events does not relate to what the community experiences. Mr. Nicosia-Rusin explained that presently all aircraft taxiing to the ends of runway 22R and 22L use Taxiway N and approximately ½ of these would be able to use a centerfield taxiway further from the community. Ms Welch said this would enable greater taxiway capacity. Mr. Egan said this issue had already been addressed and that while Ms. Welch might not like the metric Mr. Miller was saying that noise would go down. Ms. Welch brought up that additional capacity would result in additional operations and noise. Mr. Silva explained that the availability of additional taxiway capacity would not likely cause additional operations. The airlines would not schedule additional operations because of the availability of the centerfield taxiway. Discussion continued among panel members on this point.
- Reference the question of simultaneous approaches to Runways 32 and 33, Mr. Miller said it can't be done, but that the noise exposure would be the same regardless. Mr. Silva added that two simultaneous operations would have less exposure than sequential operations.
- Reference the question of specific elements of noise analysis for Runway 14-32, Mr. Miller explained that tracks over the south shore and additional operations from Runway 27 would not exceed FAA's guidelines of significant noise levels. Ms. Welch suggested a different explanation by stating that a 3 dBA increase is a doubling of the sound energy. Mr. Miller agreed that was taken into account in the noise analysis.
- Ms. Welch asked about other studies on the relationship between noise and impact on people, mentioning a study about impact on fetuses. Mr. Miller responded that such health studies have been inconclusive.
- Mr. Miller concluded that at more distant sites such as Hull, none of the alternatives would produce significant noise levels (65 DNL or above).

<u>Observer Comments</u>

- Ms. Lyman asked whether the centerfield taxiway would bring aircraft ground noise closer to Winthrop. Mr. Davis answered not necessarily. Ms. Lyman also asked about increases in noise from increased operations on Runway 33.

- Mr. D'Amico said that the centerfield taxiway would bring aircraft ground noise closer to Winthrop. He also noted that at one time Massport decided not to go ahead with the centerfield taxiway north of Runway 33.

The meeting concluded at 5:58 p.m.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

<u>Draft Minutes</u>
September 27, 2000

I. **Agenda** (See attached)

II. **Participants:** All panelists were present.

III. **Discussion**

<u>Opening Remarks, Review of Minutes, Updates</u>

- The meeting opened with a review of the agenda. The facilitator noted that the focus of this meeting would be on concluding the discussions of delays at Logan, and beginning the discussion of environmental impacts.
- Mr. Scarano updated the Panel on several items.
    - He communicated Mr. Egan's questions about accelerating the Panel process to FAA Director, Jane Garvey, and received no indication from her of any need to accelerate the process. He also requested information for the panel about how the national summit on delay relates to the Panel's work, and is awaiting a briefing paper which he will distribute.
    - Mr. Scarano clarified that the summary of comments and responses to the DEIS sections on noise that were distributed to Panel members had not been updated since the Panel began meeting, and therefore should not be expected to include any ideas discussed in Panel meetings.
    - Mr. Scarano distributed copies of letters regarding Shuttle America's proposal to serve Laguardia Airport from Hanscom. He noted that Mr. Rushing had requested copies of these letters, and that he was providing them to all panelists, as required by the groundrules. In the discussion of the topic of these letters, consultation with the State Historic Preservation Office (SHPO), a question arose about the consultation with SHPO on the Airside Improvements Project. John Silva from FAA stated that section 106 coordination was completed as part of the Airside DEIS. Information was provided to the SHPO, including noise contours and identification of historic properties, and the SHPO had found no historic resources were unduly impacted. Mr.Rushing mentioned that Congressman Moakley had requested a review of this finding in a letter to the FAA.
- The minutes for Sept. 6 were reviewed. A typo was corrected, as was a statement of Mr. Scarano regarding a regional airport coordination meeting. Mr. Rushing asked a follow up question to an item in the minutes about Mr. Scarano's attending the Sept. 18 CAC meeting. He asked if there were minutes from that meeting. During Public Comment, Anastasia Lyman, Chair of the CAC, noted that there are minutes that could be made available to the Panel after they are finalized.
- Ms. Welch submitted a list of written questions and concerns from several community groups. She also noted that community members from the town of Winthrop have asked

the Panel to delay finalizing the SDEIS until after completion of a study of health effects from the airport on citizens of several neighborhoods in Winthrop. Mr. Scarano noted that the information about the study could be submitted during the public comment process on the SDEIS. Mr. Egan spoke against the need for the Panel process to be delayed. Mr. Tye noted the need to have as much information as possible for the ROD, and Mr. Rushing noted that if the information would improve the SDEIS, it should be reviewed. The duration and completion date of the study are not known, but will be researched prior to the next meeting.

<u>Congestion at Logan Airport and Potential Remedies</u>: Presentation by Professor Amedeo Odoni.

- Amedeo R. Odoni, T. Wilson Professor of Aeronautics and Astronautics at MIT, provided a briefing to the panelists based on his academic experience, nationally and internationally, evaluating delay and delay reduction at airports. He noted that there is no question that Logan is a seriously congested airport, with about 100,000 hours of delays per year. This level of delay represents about $150,000,000 in costs to airlines and $150,000,000 in costs to travelers. He outlined three potential solutions for the short term: Runway 14/32, peak-period pricing, and improvements in Air Traffic Control (ATC). He agreed with the delay reduction projections for the runway presented by other consultants, but noted that projected delay reduction benefits may be reduced by the switch from turboprops to regional jets. He further explained that for peak-period pricing, a small number of flights could result in a large decrease in delays. For example, a one per cent reduction in flights, could reduce delays by 7%. He noted that demand by non-jets at Logan has been reduced from 1993 to 1998, and that the 1998 demand is flatter over the day. He suggested analyzing the reasons for this change as part of the SDEIS analysis. Regarding ATC improvements, Dr. Odoni felt that their benefit at Logan is minimal - perhaps 5-10% - because of the complex geometry at the airport. He summarized his suggestions for further analysis as follows:
    - Determine if regional jets will use Runway 14/32 in sufficient numbers to achieve projected delay reductions.
    - Define and examine how 14/32 could be used in IFR, in addition to the VFR conditions.
    - Analyze why hourly demand changed between 1993 and 1998 to obtain information that may help design effective demand management.
- Professor Odoni noted that the medium and long-term solution for Logan airport is to develop a coordinated regional airport system because demand will eventually continue to exceed capacity, even with improvements. This will require Logan to make some tough decisions about its most appropriate role in the regional system. He reiterated that the outlook for Logan to improve in delays is bleak, and that the eventual capacity is probably limited to 550,000-580,000 operations. With current operations at 510,000, there is only room for 10% growth, which is much lower than the amount by which unconstrained demand might increase over the next 10-20 years.
- Lt. Governor Swift asked Professor Odoni what he saw as the major constraints to the development of a regional system. He responded that institutional constraints are the most obvious, and that the airports need to feel they have stakes in each others'

success. He further noted that the process of making choices about Logan's specific role in the regional system would also be difficult.

- Mr. Rushing asked what the definition of capacity is at Logan. Mr. Odoni said it is the number of operations per hour that can be accommodated without violating ATC constraints. For Logan this is 120 operations per hour in VFR.
- Mr. Tye asked how many hours of the 100,000 hours of delay are perceived by the consumer. Professor Odoni noted that Logan is perceived as a very unreliable airport by consumers, whether or not they perceive the hours of delay with each flight.
- Mr. Scarano asked whether and to what extent federal and state laws impede collaborative planning among airports. Professor Odoni said they play a large role. For example, recent federal legislation that says only planes with under 71 passenger can be added to Laguardia makes little sense and goes in the opposite direction to what should be happening there.
- Mr. Scarano asked if there are examples of integrated airport systems elsewhere. The response was that London's three airports are operated in a coordinated manner, and that Amsterdam and Brussels are coordinated. The mechanisms for encouraging coordination do not necessarily have to be regulations; price incentives on gates and fees for passenger use of terminals can also be used to create appropriate incentives.
- Mr. Tye asked if Runway 14/32 would restrain the growth of delays at Logan. Professor Odoni said it would under NW wind VFR conditions, and possibly in IFR conditions. The delay reduction will be temporary, because additional demand will fill in, but that increase in demand would occur anyway and would create worse problems without Runway 14/32.
- Ms. Welch asked about the suggestion to use runways 32 and 33 in parallel in IFR conditions. She suggested that the simultaneous approaches would create more noise, especially when planes approach over land rather than the required over-water approach. Professor Odoni noted that the least environmental impacts are from approaches on runways 33 and 32, if the flights adhere to the flight paths.
- Ms. Welch asked why the changes in the fleet mix to include regional jets might reduce delay reduction benefits from the runway, asking if the difference between what the aircraft manufacturers say is sufficient runway length and what pilots feel is sufficient is a factor. Professor Odoni agreed with this reasoning, noting that pilots may reject the 5000 foot runway, as they have objected to Land and Hold Short procedures.

<u>Overview of Noise Impacts from Airside Improvement Project</u> - Bob Miller, HMMH

- Bob Miller of HMMH presented an overview of the analysis conducted for the DEIS of noise impacts from the Airside Improvement Project. He explained the DNL metric and the use of 65 DNL as an FAA guideline of residential land use compatibility. He described current and past noise rules at Logan, and the soundproofing insulation program. He reviewed the noise contours in the DEIS, noting that fewer people will be exposed to the highest level of noise - 75 and 70 DNL - and that there would be a slight increase in noise within the 65 and 60 DNL. He outlined mitigation measures to address these impacts, including noiseproofing and PRAS monitoring to improve the distribution of the noise across neighborhoods.

- Ms. Welch noted that even at levels lower than 65 DNL, the aircraft noise is irritating and distracting. Mr. Miller noted that 65 DNL is the cut-off for federally funded soundproofing, but it does not mean that those at 64 DNL have no impacts. He further mentioned that EPA has identified 55dB as being of concern, and that studies have found that in 55dB areas, 17% of the population experience annoyance.
- Mr. Tye asked at what dB level conversation would need to stop. The response was around 60-65.
- Ms. Welch noted that assumptions about how often planes fly over water are not borne out in practice. She also noted that if 14/32 is built, flights off of runway 27 will triple, and that needs to be factored into the impact assessment.
- Mr. Rushing asked why there are increases projected in exposed populations. Mr. Miller responded that take-offs and landings will be in different geographic areas with the new runway.
- Lt. Governor Swift noted that it would be useful to provide the Panel with a handout explaining what is included in the metric of DNL. She further noted that delays are irritating, just as airplane noise is, and asked if there was information available about the extent of annoyance caused to consumers by delays.

IV. Public Comment

- John Marcy, from Winthrop and a member of Winthrop's AIR Environment-Health Committee, presented the panelists with a copy of a letter to Jane Garvey explaining the upcoming study of health effects from the airport and requesting that the Panel not be concluded prior to the completion of the study.
- Anastasia Lyman, Chair of the CAC, noted the need for community involvement in the Panel's work, offered copies of the minutes of the recent CAC meeting to panelists, and asked that the Panel and public be provided with a copy of the recent Chicago O'Hare air quality study. She further noted that there is a need for new noise rules at Logan.
- Blossom Hoag asked that Ms. Welch's questions be placed on the web site, and that there be more outreach to the public. She further commented that she is surprised at the limited amount of discussion among the Panelists, and that the process seems to consist mostly of lectures by advocates for the runway.
- Steve Lathrop from Hull reminded the Panel that the south shore is affected by airport operations, and that over-the-water flights often affect Hull. He noted that some flights pass over Hull High School at 1500 feet.
- Mr. Pepper-Eisenberg, of Save Our Heritage, spoke in favor of peak-period pricing as an important part of the solution. He referenced Mr. Odoni's support for it, and also noted Mr. Odoni's statements that the runway is a temporary fix. He questioned why the runway is needed if it will be a short-lived solution. (Professor Odoni responded to this question after the meeting. See his note, attached.)
- Gerry Falbo from Winthrop noted that cumulative effects of additional operations did not correspond to the cumulative noise exposure described by Mr. Miller.

V. Scheduling and Planning for Next Meeting

- The Panel agreed to continue the discussion of noise and environmental justice at the next meeting, which was rescheduled to October 10.
- The Panel scheduled several additional meetings to accommodate its workplan. They are:

  October 10, from 3 to 5 PM
  November 13 from 3:30 to 6:00 PM
  December 4, from 4:00 to 7:00 PM
- The October 12 meeting previously scheduled will be held as a reserve date in case the discussion of October 10 is not completed, and would be held with only four panelists present if it did go forward.
- The December 4 meeting will be focussed on Panel review of a proposed outline for the draft SDEIS, and will be the final meeting before the SDEIS is developed.

VI. The meeting adjourned at 7:05 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
August 22, 2000

I. **Agenda (See attached)**

- The Panel convened at 11:15 AM

II. **Discussion**

Opening Remarks, Review of Minutes, Updates

- Suzanne Orenstein, facilitator, opened the meeting with a review of the agenda, noting that the focus for this meeting was on sources of delays and demand management strategies.
- *Minutes:* The final minutes for the July 13 meeting were distributed. The minutes for the July 26 meeting were revised after Mr. Egan commented that Mr. Davies responses to several questions were more emphatic than noted in the draft minutes. His suggested revisions were accepted by the Panelists.
- *Regional Airport Visits*. It was noted that the Panel had completed visits to Providence and Worcester airports, and was scheduled to visit Hanscom and Manchester on August 28. Handouts from the visits were distributed to those Panelists who did not participate. Mr. Scarano mentioned that Pease airport, a large converted military facility, might be another airport for the Panelists to visit, and offered to arrange a tour on request.
- *National Air Traffic Delay Summit.* Several Panelists noted the national news about airport delays. Mr. Egan distributed articles from *The Boston Globe* and *U.S.A. Today*. He also noted reports of the summit on airport delays convened by Secretary of Transportation, Rodney Slater, on August 21. He particularly noted the identification at the summit of seven choke points in the airport system, one of which is Logan Airport. He asked the FAA to inquire whether national actions on delay would necessitate or benefit from an acceleration of the Panel process. Mr. Tye asked the Chair to ask Administrator Garvey for information from the summit that could help the Panel in its deliberations, particularly whether there is a national plan to deal with the delays, including those in Boston. In response to Mr. Egan's suggestion of a need to accelerate the Panel process, Ms. Welch asked that the Chair also request of the FAA a moratorium on expansion at all New England airports until a regional inter-modal transportation plan, with citizen input, was developed.
- *Independent Technical Consultant.* Mr. Scarano introduced Jim Muldoon, who has been hired as FAA's technical consultant to the Panel. Mr. Scarano noted that Jim had worked as General Manager of Aviation Technical Services for the Port Authority of New York and New Jersey. He also noted that Mr. Muldoon's bio and Scope of Services had been provided to the Panelists. The Scope of Services makes clear that while Mr. Muldoon works under FAA direction, he will be available for consultation with various interest groups and Panel members.

- Mr. Egan questioned why eight Panel meetings were mentioned in Mr. Muldoon's Scope of Services. The facilitator noted that there are four meetings scheduled, including today's, and two additional meetings to be scheduled on the draft SDEIS. Mr. Scarano explained the need to build in some flexibility in the contract scope.
- Panelists requested contact information for Mr. Muldoon. He said he would provide it through Mr. Scarano.
- Mr. Tye asked if Mr. Muldoon could help the Panel consider whether peak period pricing and other demand management strategies could offset the need for a runway. Mr. Muldoon responded that he could do so.
- Mr. Rushing asked that all Panelists be apprised of all questions posed by Panelists to Mr. Muldoon. Mr. Muldoon suggested that he forward an e-mail of all questions presented to him to Mr. Scarano, who could then forward the list of questions, and answers when available, to all Panelists.

Presentation on Sources of Delay

- Beverly Jones, of S, H & E, presented an overview of the sources of delays at Logan Airport. She reviewed the various delay tracking systems, including FAA's OPSNET, DOT's Air Travel Consumer Report, and FAA's CODAS system. She highlighted that all of the existing delay tracking systems have serious limitations, in that they do not count several types of delays, like those under 15 minutes, or those resulting from mechanical problems or otherwise under the airlines control. As a result of the limitations on the existing data collection, it is necessary to develop simulation models to estimate delay reduction impacts. Ms. Jones reviewed Logan's national ranking on delays. In 1999, Logan was 4th most delayed in the DOT Consumer Report, and 8th most delayed in the OPSNET data. In 1998, Logan ranked 2nd in the DOT Report, and 7th in the OPSNET. Logan ranks 8th in total passengers and 14th in operations nationwide. Based upon simulation of the 1998 flight schedule and the actual hourly weather observations from that year, Ms. Jones presented estimates of the various sources of delay at Logan. Of the total delay, 43% occurred in VFR (clear weather) conditions. Northwest wind conditions occurred in 37% of VFR conditions. However, 70% of clear-weather delays occurred during northwest wind conditions. The new runway would have eliminated 68% of the VFR delays in 1998 and 32% of the total delay.
  - In response to a question from Mr. Rushing about when a delay is considered "significant," Mr. Nicosia-Rusin from FAA noted that a traditional benchmark of significant airport delay is 20,000 hours annually. Logan's annual hours of delay have been 120,000.
  - Ms. Welch asked whether efforts are underway to improve the delay tracking systems to include all the delays that are missing from the current data. She also asked how airline overscheduling and its impact on delays is factored in to the current models.
  - Mr. Tye noted that there is a question where to put the regional aircraft if they are a sizeable contribution to total delay. He asked if other regional airports could handle some of these flights, and achieve the same delay reduction as the runway. Mr. Tye requested data on how much regional airlines contribute to the delay.
  - Mr. Rushing asked about how Logan would rank if hours of delay were reduced. Ms. Meehan, President of S, H &E, noted that it is difficult to calculate this without

modeling activities at all other airports. Mr. Nicosia-Rusin offered that although not accurate enough to publish, a sense of the impact on Logan's ranking could be determined by considering that total simulated delays were reduced by about 32%. You could say then that this might represent a 25% reduction in the flight delays recorded in OPSNET, and make your own judgement on how that would affect the rankings. Mr. Rushing asked if it is possible to find out where the delayed flights are coming from or going to. Ms. Meehan noted that this is possible to produce.

Presentation on Peak Period Pricing

- David Hollander of S, H & E, gave an overview of the Peak Period Pricing (PPP) proposal evaluated in the draft EIS. He described a previous Massport PPP initiative, the PACE program, which was developed and implemented in the late 80's, but overturned in a lawsuit. He described how the $100 to $150 peak period fee proposed in the DEIS was developed, and the anticipated delay reduction results. He showed that current operations at Logan are within the 120 operations per hour capacity, and therefore PPP invoked at 110 operations per hour would not have much delay reduction effect. However, if operations go above 120 per hour, as is predicted for the future, then PPP would have significant delay reduction results. That was the rationale for including a monitoring program and trigger for PPP in the DEIS mitigation plan. He further outlined a proposed exemption program for situations in which PPP would reduce flights to communities that need the current number of flights, specifying that these communities would be allowed two flights in peak periods that would be exempted from the peak period fee.
    - Ms. Welch noted that letting the delays escalate to the trigger point before invoking the PPP did not make sense. She asked whether the PPP could be developed from the beginning, setting a trigger that could start as soon as it was reached, thereby advancing the several months of rulemaking that would be needed to implement the program. Richard Litteri, a Massport attorney, commented that the rulemaking process is a state DOT process, which might take six months to conduct. Ms. Welch suggested that Logan become a national model and implement PPP prior to the construction of a new runway.
    - Mr. Hollander was asked if PPP is in place anywhere in the U.S. He responded that it is not.

Presentation on PPP and Other Demand Management Strategies

- Fred Salvucci, Former MA Secretary of Transportation and Professor at MIT, gave a presentation on PPP and other demand management strategies. He began with a statement that he was not representing the views of any other groups in his remarks, but was speaking from his own viewpoint. In his presentation, he proposed that the airport needs to find a way to increase load factors, make other airports and transportation modes more attractive, and conduct sensitivity analysis of various capacity levels at the airport to determine a reasonable level of operations. He noted the need to work with LaGuardia Airport to prevent gridlock on the Boston/New York routes. He further noted that many prior mitigation projects for Logan activities have not been implemented, creating credibility problems for new mitigation proposals. He

suggested that the existing injunction could be used to create enforceable commitments to address RW 14-32 impocts.

- Mr. Salvucci outlined several demand management options, in addition to PPP:
  - Terminal/gate regulation (set number of movements per hour)
  - Asking airlines to consolidote flights voluntarily ("jawboning")
  - Flot landing fees with off-peak discounts
  - Expanded use of Logan Express buses to TF Green, Worcester, Manchester, South Stotion, and Rte. 128 rail station
  - Expanded high speed rail to Worcester and Springfield via an inland route
  - Upgrade Logan's rail connection, including South Stotion
  - Pilot test a chonge in the FAA's first-come/first-serve policy for certoin, small aircroft types
- Lt. Governor Swift and Mr. Litteri discussed how demond monogement strotegies could be designed to avoid the legal problems that the PACE progrom faced, and there wos general agreement that a PPP program could be designed to avoid those problems.
- Ms. Welch odvocated that a regional intermodal solution and PPP be implemented prior to any runway construction. She further noted that the affected communities do not agree with Mr. Salvucci when he suggests the possibility that a new runway be constructed with restrictions of use only in NW wind conditions.
- Mr. Butler pointed out problems with some of Mr. Salvucci's suggestions, including
  - the impossibility of chonging the first come/first serve policy,
  - the move to eliminote, not create, slots ot most airports,
  - the lack of connection between ground access and RW14-32,
  - the fact that demand monogement could be viewed as interfering with interstote commerce, especially if the number of flights thot would trigger PPP wos ortificiolly lowered,
  - take-offs are not a problem ot Logon, ond
  - the United Airline changes in Son Froncisco were not induced by demand management approaches, but by United's pilot strike.

- When the Panel was asked for views about the improvements in the SDEIS on the issues of PPP, Ms. Welch responded that she would like to see PPP included in the Preferred Alternative from the beginning. Others suggested thot any PPP program be designed to withstond legal challenges.

III. Public Comment

- Marty Pepper Aisenberg, from Save Our Heritoge, asked whether it was within the jurisdiction of the panel to implement demand monogement or in their jurisdiction to recommend to FAA certoin demand management strategies. Mr. Scarano responded that is wos more likely the latter.
- Dan Wolf, President of Cope Air, tolked obout the impact of PPP on airlines like his, with small aircroft, but who do not contribute to the delays nor compete with larger aircroft for runway spoce, since they use the 2500 foot RW33R-15L. He also said the regional jet fleets are being purchased by airlines for over $10 million per plane, and that a $150

PPP fee might not make much of a difference to those airlines. He thought other forms of demand management might be more effective.

- Bob D'Amico from the City of Boston, questioned a statistic used in the discussion, asking whether it included arrivals and departures, or just arrivals. It was clarified that in bad weather, arrivals are reduced to 45 per hour, not all operations.
- Blossom Hoag from CARE and the Sierra Club asked for clarification about whether flights leaving the gate on time, but delayed awaiting take off, were considered on-time flight departures. Panelist John Butler responded that the flight could be considered delayed if it took off late.
- An aide to Representative Robert DeLeo noted that the Representative had been present for a portion of the Panel meeting, but regretted not being present to make public comment due to a conflicting appointment. He may submit comments to the Panel in writing.

IV. Planning for Next Meeting

The Panel reviewed and revised the draft meeting agenda for September 6. The Panel agreed to meet beyond 7:00 PM if necessary for that meeting, but, given Ms. Welch's inability to stay beyond 7 PM, adjusted the schedule of presentations to fit most of the Panel deliberations in the 4:00 to 7:00 time slot.

V. The meeting adjourned at 4:00 PM.

Boston Logan International Airport

Supplemental Draft EIS (SDEIS) Panel

Minutes
July 26, 2000

I. Agenda (See attached)

- The Panel convened at 4:07 PM

II. Attendees (See attached list)

- Mr. Rushing was not present; the House of Representatives was in session.

III. Discussion

Presentation on Multi-Modal Transportation Planning by Kevin Sullivan, MA Secretary of Transportation

- Secretary Kevin Sullivan provided the Panel with extensive information about efforts underway by Massachusetts, and neighboring states, to improve the coordination of all modes of transportation. He described the following initiatives:
  - Road signage for all regional airports, including signs in RI and NH
  - Expenditure of $154 million in highway funds "flexed" to transit and train projects
  - Dialogue with RI that resulted in eight rail trips per day from MA to Providence which will also serve Warwick/TFGreen Airport when the station is completed
  - The commitment of $385 million for the widening of Route 3 from 128 to the NH border
  - Investigation of a partnership with NH to encourage rail service between Nashua and Lowell
  - Massport efforts to increase flights at Worcester Airport from 9 to 19 per day
  - Manchester Airport evaluation of the environmental impacts of a new access road
  - Development of an intermodal facility in Wilmington, MA
  - Rehabilitation of Worcester's Union Station
  - Development of a business facility at Hanscom
  - Promotion of the Accela train for a lower fare than the NY shuttle from Logan
  - South station connector to Logan via the new Silver Line
  - Expansion of MA commuter rail, which is now the 4th largest in the country and the fastest growing
  - Development of bus service in the Urban Ring
  - MBTA Blue Line expansion
  - Initial planning for the North Station/South Station rail link
  - Development of smaller airports by MA Aeronautics Commission

- Mr. Egan asked if there were other efforts involving more than one state in aviation planning. Mr. Scarano responded that this is a first effort of this scale, to his knowledge.

- Ms. Welch asked the Secretary about plans for improving the Blue Line, which have been put off several years. The Director of the MBTA responded that they are pursuing the capital program for this and the rail service from South Station to airport through the Ted Williams Tunnel.
- Mr. Tye asked about what numbers of passengers could be diverted from Logan. Mr. Sullivan responded that growth is at regional airports, not at Logan. Lt. Governor Swift noted that it is not easy to determine if regional airport growth is totally a diversion of Logan traffic. Ms. Meehan (S, H. & E) added that roughly 1/3 of new passengers are new travelers brought into the market by low fares, and another 1/3 are diverted from Logan.
- Mr. Scarano asked about the development of a rail line from Lawrence to Manchester, and Secretary Sullivan responded that the priority is on the line between Lowell and Nashua, where there are existing rights of way.
- Ms. Welch asked if bus service could be instituted from Woburn to Manchester, in addition to the Woburn-Logan service. The Secretary noted that he is trying to encourage this service.
- Ms. Welch asked how close to completion the North Station-South Station rail link is. Mr. Sullivan remarked that it is a $3-$6 billion project, and will not happen without considerable time and effort to identify and secure the funding.
- In response to a question about the Urban Ring, Mr. Sullivan clarified that a transit rail system was much more difficult to achieve than a bus service along the ring. The bus service is in the planning stage. The price for the transit service is several billion dollars, and this project is competing with the North Station-South Station rail connector for funding.

Summary Comments on Regionalization and Forecasting

- Ms. Orenstein asked the Panel to comment on how the SDEIS should reflect their concerns about forecasting and regionalization. Mr. Scarano asked the Panelists to consider whether the forecasting covers a reasonable range of scenarios. In response, the Panelists made the following comments.
    - Ms. Welch asked if a different kind of forecast, one with a lower low passenger estimate and a lower high passenger estimate, could be developed and used to understand how much diversion to regional airports should occur. She also asked if this revised forecast could be used to evaluate airline overscheduling and aircraft mix.
    - Mr. Tye asked how to avoid a new runway for a problem (NW winds) that occurs only 20% of the time. He asked if traffic could be prioritized and/or diverted, as happens in bad weather.
    - Ms. Welch noted that, while there are many pieces in place or in planning for multi-modal transportation, there is no integrated, coordinated planning process, and what does exist does not offer a vehicle for citizen input. Lt. Governor Swift noted that the New England Council of Governors has sponsored a New England Transportation Initiative, which is the vehicle for interstate planning and cooperation on multi-modal issues.
    - Lt. Governor Swift noted that a strength of both the regionalization analysis and the forecasting done for the EIS is that there is careful tracking of regional

airport users. This helps create understanding of what is driving regional airport use. She recommended that this tracking continue.

Panel Administrative Discussions

- The minutes of the previous meeting on July 13 were finalized and accepted.
- Ms. Orenstein noted that in an effort to increase public access to the panel operations, agendas and presentation slides (when in the compatible electronic format) will be posted on the FAA web site.
- The Panel briefly discussed its upcoming visits to four regional airports on August 16 and 28. Panelists had previously asked for passenger forecasts and market projection information for these airports, and Mr. Scarano noted that this information would be requested from the airport directors for presentation during the site visits. Lt. Governor Swift also noted that it would be helpful for the Panelists to receive information about the decision making structure and lines of authority between the states and the airports.
- Mr. Scarano announced that the FAA had decided to hire an independent consultant for the Panel. He anticipated the consultant would be on board in mid-August. Mr. Egan asked whether this would delay the Panel process and the FAA decision on the SDEIS. Mr. Scarano said FAA remains committed to its goal of a final SDEIS by April, 2001, but that reaching the goal is dependent on Panel events and analysis that are difficult to predict.
- The Panel set dates for interim meetings after the August and September meetings, in case they will be needed. The new dates are September 6 and October 12, from 4:00 to 7:00 PM. The list of meeting dates will be revised and posted on the website.

Overview of Logan Airfield Operations, Joe Davies, FAA Tower Manager

- In preparation for understanding delays at Logan, and the potential impacts of the proposed project on those delays, Joe Davies presented an overview of how Logan airport operates. He explained the air traffic control system in general, and airspace around Logan, and the location of the runways, taxiways, and terminal areas. He then described the configurations of runways that the controllers use, their efficiency, noise and environmental restrictions, and operational needs in VFR and IFR. He concluded by saying that the taxiway, minimums, and runway 14/32 would improve the options available for air traffic control, and also would provide a greater ability to use the Preferential Runway Advisory System (PRAS).
- Ms. Welch asked how well the airport was complying with the PRAS system. Mr. Davies noted that recent data showed that some goals were met, while others were not. Mr. Egan asked if RW 14-32 would allow airport to better meet PRAS goals. Mr. Davies response was yes.
- Mr. Tye asked whether small planes could be diverted to other airports during NW wind delay periods. Mr. Davies responded that it would be illegal. Federal law requires aircraft to be accommodated on a first come-first serve basis.

Observer Comment

- Susan Black, Marketing Director for the Worcester Airport, commended Massport for their efforts at developing the Worcester Airport, and noted that Worcester looks forward to the Panel's visit to the Worcester Airport.
- Peter Koff of AIR said he had sent a letter to Jane Garvey commenting that the Panel process has not spent enough time on issues which would need to be addressed in the SDEIS. He distributed copies of his letter to the panelists.
- Blossom Hoag of the Sierra Club and CARE commented that Mr. Sullivan's presentation did not have many numbers to back it up. She also commented about how undesirable it is to have the North Station-South Station connector pitted against development of the Urban Ring.
- Steve Lathrop, from Hull, commented on the inadequacy of passenger volume and operations analysis. He suggested the Panel ask what might cause more passengers on fewer aircraft. He suspects that operations forecasts are too high, but noted that forecasts are often optimistic and need to be tempered with realtime or very recent data. He also remarked that the Panel has spent too much time on what environmental improvements can be expected from a new runway, and not enough time at looking at alternatives to reduce delay. He asked the Panel to take a broader perspective.

Panel Discussion of Public Outreach Issues

- Ms. Welch asked the FAA to hold community meetings, scheduled in the evenings to encourage attendance, about the Panel process. These meetings could be attended by Panelists if they desired, and might be sponsored by the Citizen Advisory Council (CAC) for the Airport. She proposed that a meeting with the CAC happen in September, and that three additional meeting happen in October to increase the outreach to several geographic regions.
- Mr. Butler and Mr. Egan objected to these outreach meetings, noting that a large number of community meetings have already been held on the runway issue. Mr. Butler noted that these meetings would not meet the Panel's objective of providing input to FAA.
- Mr. Tye suggested that the public's questions should be put in writing. He also suggested that a Panel meeting could be held in the evening to accommodate more public observers.
- Mr. Scarano noted that Mr. Rushing and Lt. Governor Swift (who had already left this meeting) needed to be consulted on this issue. Ms. Orenstein suggested the Panel return to this question at the next meeting.

IV. The meeting adjourned at 7:15 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes
July 13, 2000

I. Agenda (See attached)
- The Panel convened at 2:35 PM

II. Attendees (See attached list)

III. Discussion
Organizational Issues
- Mr. Scarano opened the meeting with a statement that it was his hope that the Panel would devote most of the meeting to substantive discussion of regional transportation issues. He noted the presence of Todd Burger, an expert on rail service forecasting, and mentioned the plan to have the MA Secretary of Transportation attend the next meeting to discuss regional multi-modal transportation planning. Facilitator Suzanne Orenstein reviewed the agenda, noting that in an effort to make up time after delays at the last meeting, the focus for this meeting would be on Panel discussions, and public comment would be taken only if time allowed. Ms. Welch asked that time be allotted for Panel discussion after each presentation, not solely after the first two presentations and at the end of the meeting. The Panel agreed to address questions during the presentations, in an effort to encourage Panel discussion.
- The minutes for the June 22 meeting were reviewed. No corrections were made. The June 22 minutes were finalized and will be placed on the web site.

Forecasting Presentation (continued from past two meetings)
- Ralph Nicosia-Rusin, FAA Airport Capacity Program Manager, began this portion of his forecasting presentation with a review of his previous presentations regarding projections for numbers of passengers and numbers of flight operations at Logan. He continued the presentation with explanations of how the forecasts for passengers and operations used for the DEIS were consistent with those developed for other studies. He reviewed criticisms of the forecasts, addressing issues regarding confidence levels (he noted that by using a range of forecasts, confidence levels could be close to 100%), and whether the data used for the forecast was current. Ms. Welch asked whether the forecasts could be further updated to use 1999 and/or 2000 data, in addition to the update from 1993 to 1998 in the Brown Book. She noted this would have the advantage of incorporating equipment upgrades and producing more accurate noise information. Mr. Nicosia-Rusin responded that the data will always be behind the present because of the 6-8 months it takes to produce the model results. He further noted that comparisons of one year to another were not as significant as comparisons of the build and no-build alternatives. He ended by stating that when delay reduction benefits of the proposed Airside Improvement Project are evaluated using both the low and high ends of the forecast ranges, the results do not differ significantly, except for the

increase in effect of Peak Period Pricing at the higher passenger estimates. This leads him to conclude that the forecasts are sufficient for the evaluation of the project.

- Discussion following Mr. Nicosia-Rusin's presentation included the following additional comments and questions.
  - Are there demand management techniques in use at other airports, other than Peak Period Pricing, that should be considered for Logan, and that could be evaluated using the forecast and other models?
  - Ms. Welch noted that an FAA web site presented data comparing delays at various airports that showed that delays at Logan were decreasing by 6%. Mr. Butler responded that delays at Logan are not down, and that airports are not directly comparable, because some have parallel runways that provide more flexibility for reducing delays. Logan's runways are intersecting, so managing delays at Logan is more complicated than at other airports. Mr. Nicosia-Rusin noted that delays at Logan are affected by incidence of weather conditions that are not consistent from year to year, so decreases might occur, but might not be consistent over time. After considerable discussion of the delay issues, the Panel asked for a break down of all causes of delay by source and frequency. <u>Noting that some sources will be unknown, S, H, and E agreed to provide a breakdown of causes of delay for the discussions at the next meeting on airfield operations.</u>
  - Mr. Tye commented that he was not comfortable with conclusions that the benefits of the runway were borne out by the forecasting process. He heard a lot about the benefits of a new runway but nothing was presented regarding the need for it. He views the Panel's role as examining the need for the Airside Improvements Project, and finds the conclusions premature.

<u>Presentation on Regional Alternatives</u>

- Deb Meehan, President of S, H, & E, gave an overview presentation of how regional alternatives to Logan were factored into the Logan passenger and operations forecasts. She noted that the forecasted passenger numbers include an estimate of 7 million passengers diverted to regional airports, rail service, and video conferencing and how the estimates for those diversions were developed. She noted that regional carriers will continue to need to serve Logan because 59% of their passengers are connecting to non-stop flights that are not available from T.F. Green or Manchester, and that the remaining regional carrier passengers have Boston as their destination. In the discussion of regional alternatives, the following comments and questions arose.
  - Mr. Tye commented that he was interested in options for using regional airports to the maximum extent available as a way to reduce operations at Logan. Mr. Scarano and others responded that both Manchester and Providence were growing at unbelievable rates, but that their growth would be constrained by the physical and land availability, even after major improvements in access and facilities.
  - Ms. Welch asked if airport plans and projections for all regional airports could be researched and reported to the Panel. <u>Ms. Meehan and FAA agreed to provide this information.</u> Ms. Meehan also explained how some regional airports compete with others, which also might limit growth. For example, Bradley, Manchester, and Providence all serve part of the area that Worcester airport could serve.

- Mr. Tye and Ms. Welch asked about whether Logan should de-emphasize the market for short-haul trips. They asked for information about the average aircraft size for short, medium and long haul trips, and how these factors affect Logan operations. Ms. Meehan agreed to provide this information.
- Several panelists, and Mr. Burger, commented on the factors needed to promote growth at regional airports, including proximity to the traveling population, ease of access to the airport, and sufficient service to meet travelers needs for flexibility.
- Ms. Welch requested that the FAA research how many airlines will use a 5000 foot runway and whether they will make a specific commitment to do so. Mr. Scarano noted that this would be addressed at the next meeting.
- Mr. Egan remarked that much has been accomplished in the regional airport development process and that it appears that all of the Panel Members support improvements in the regional transportation arena. When he asked whether the opponents of the Logan Airside Improvement Project also opposed the expanded use of Hanscom Field, Ms. Welch responded that the Mayor's representatives support increased use of Hanscom Field.

Presentation on Potential Impacts of Rail Service on Logan Forecasts

- After a short break for an executive session, Todd Burger, an independent transportation consultant formerly with Arthur D. Little, and project manager for the Strategic Assessment Review (SAR) in 1993, presented his view of the realities of diverting Logan passengers to high speed rail. He noted some factors that may reduce the desirability of the high speed rail alternative in the Northeast Corridor, including potential rail traffic delays. He noted that rail service between Boston and TFGreen airport might be more successful than anticipated, but that this might adversely impact passenger use of Worcester airport. Lt. Governor Swift noted that MBTA, not Amtrak, would be operating the TFGreen rail service. Mr. Burger noted that he thought the forecast estimates for Logan, which are quite consistent with the forecasts used in the SAR, are on-target in spite of slight changes in the rail diversion numbers. He also noted his conclusion that rail service will not be a substitute for runway 14/32.

IV. Observer Comment

Because State Representative McManus, from Worcester, asked to address the Panel, having traveled to the meeting from his vacation to do so, time was made available for some public comment. Representative McManus spoke appreciatively about Massport's efforts to increase air traffic at Worcester and noted Worcester's strong support for additional air service from Worcester airport. He stated that Worcester's central location and strong industry should create a market for additional service. He noted that he and others in Worcester are convinced that the access road to the airport can happen, especially if the market demand is there to support it. He noted that he did not see any conflict between Runway 14-32 and growth at Worcester, and that he thought both should occur.

The meeting adjournment time of 6:00 PM was reached before public comment from Steve Lathrop, from Hull, and Mark Cestari from Shuttle America could be heard. They were asked to make their comments at the next meeting on July 26.

V. Next Meeting

The next meeting is on July 26, from 4:00 to 7:00 PM at the Volpe Center, 55 Broadway, Cambridge, MA. The agenda will include the following items.

- Synthesis discussion among the Panel about the status of the forecasting and regional issue discussions
- A presentation on efforts to integrate multi-modal regional transportation by the MA Secretary of Transportation
- Initial discussion of the Logan airfield operations and delay factors
- Discussion of whether and how Public Outreach about the Panel process should occur.

The Panel agreed to extend the time of its August 22 meeting, which will now be 11:15 AM to 4:00 PM, in order to allow more time for discussion of airport capacity and peak period pricing. The Panel also agreed to follow through on visits to the regional airports, tentatively scheduled for August 16.

VI. The meeting adjourned at 6:03 PM.

Information Requests from July 13 Logan SEIS Panel Meeting

Item	When To Provide	Who Will Develop
1. Examples of demand management techniques, other than Peak Period Pricing, used at other airports	In background materials for August 22 meeting on PPP	FAA
2. Details of all sources of delay at Logan, what proportion of delays are caused by what source, how frequently they occur, and what the trends have been historically.	At July 26 meeting, send out before meeting, if possible	S.H. &F
3. Information on passenger growth projections and plans from regional airports, including Portland, Pease, Manchester, & Bradley	Prior to July 26 meeting	FAA
4. Information on what is being done to increase use and access for regional airports	Prior to July 26 meeting	S, H & F
5. Specific data on average aircraft size by length of haul, & how average size affects Logan	Prior to July 26 meeting	S. H. & F
6. Information on how many regional airlines will use and acknowledge commitment to use 5000 foot runway.	At July 26 meeting, or prior to August 22 mtg. on airfield capacity	??
7. Potential for improvements at Manchester Airport to affect long-haul/short-haul mix.	Prior to July 26 meeting	S. H. & F
Outstanding requests from previous meeting		
A. Geographic illustration of sensitivity of noise forecasts	Prior to July 26 meeting	FAA – Ralph Nicosia-Rusin
B. Geographic presentation of impacts of forecasts on runway utilization	Prior to July 26 meeting	FAA – Ralph Nicosia-Rusin

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes for Meeting No. 2A
June 22, 2000

I. **Agenda (See attached)**

- The Panel convened at 4:00 PM

II. **Attendees (See attached list)**

III. **Discussion**

Organizational Tasks

- In the review of the **agenda**, the facilitator stated that the goal for the meeting was to complete the presentations on forecasting and begin the discussion of regionalization as it relates to forecasting, if time allows. Mr Rushing noted that he did not receive background information on regionalization and that it was his view that there should be no discussion of this topic at this meeting. Mr. Butler responded that background information was available in the Brown Book. Mr. Scarano noted that FAA agreed that it would direct panelists to relevant sections of the brown book. He proposed that we return to the question of whether to discuss regionalization when the forecasting discussion was completed, at which time it would be known if there was time available to begin that discussion.
- The **minutes** for the previous meeting were revised to correct a quote from Mr. Rushing, and to clarify a response from Mr. Scarano. The minutes were accepted as revised and are ready for posting on the web site.
- Mr. Scarano clarified that the **meeting date for the next meeting** was incorrectly stated in the FAA memo for this meeting. It is July 13, not July 26. Ms. Welch questioned the usefulness of conducting the Panel meeting on regionalization in Manchester. Community groups who attend the meetings as observors would not be able to be present if the meeting was not in the Boston area, and regionalization is a very important issue for these groups. The Panel agreed that visits to regional airports are important, but that the meeting on regionalization could be conducted in the Boston area. The location for the July 13 meeting was changed to Cambridge, and the start time will remain 2:30 PM.
- **New Procedural Guidelines provisions** governing dissemination of information to panelists and contacts with the press and external decision makers were considered and finalized. In reviewing the guideline concerning notice to other panelists before contacts were made with external decision makers, the panelists acknowledged that this guideline would not affect contacts with the decision makers who appointed them, namely, the mayor and the governor. It

would also not affect discussions with the FAA Administrator and others that arose coincidentally at meetings and in other non-Panel forums. The Panel added a specific guideline concerning contacts with the press, namely, that panelists would avoid characterizing the views of other panelists in press contacts.

- Ms. Welch raised the issue of the need for an independent **technical consultant** to assist the Panel members. Panelists discussed this issue for some time, with some panelists expressing the view that the consultants who developed the DEIS should be adequate, and others arguing for independent consultants. Two panelists expressed the view that the Panel should not go any further in its work program until a technical consultant was hired. The Panel identified several possible roles for the consultant, as follows.
  - Help answer "what if" questions from panelists;
  - Identify alternatives to views in the Brown Book
  - Provide independent evaluation of elements of the Preferred Alternative

  Options for obtaining technical consultation for the Panel also were identified:
  - Use S, H, & E
  - Use FAA experts
  - Look for an independent consultant
  - Do homework on own
  - All of the above

  Concerns about hiring a technical consultant included that it might slow down the process, where the funding would come from, and what would be the result of conflicts among the consultant views.

  Mr. Scarano noted that the federal procurement guidelines might be prohibitively time intensive, and that it was his preference that a consultant to the Panel be hired through MassPort. Mr. Tye noted he did not care where the funding came from, as long as the consultant worked for everyone on the Panel. The Panel decided to await FAA's decision about whether and how to provide technical consultation, given that the issue had already been presented to Jane Garvey.

Forecasting Presentation (continued from previous meeting)

- Ralph Nicosia-Rusin, FAA Airport Capacity Program Manager, continued his presentation about the forecasts of passenger levels and operations projected for Logan Airport for the future. In addition to highlighting issues around fleet mix and historical passenger and market trends, Mr. Nicosia-Rusin showed how the forecasts and changes in the forecast would affect noise and delays. There were several questions and answers discussed during the presentation.
  - Ms. Welch asked whether anything could be done to put more people on larger aircraft, thereby decreasing the number of flight operations. Mr. Nicosia-Rusin showed how the low and high fleet scenarios built into the forecast took these possibilities into account.

- Ms. Welch asked about the sensitivity of forecasts to errors. Again, the response was that by using a high and low scenario, any changes are within the extremes that have been studied.
- Ms. Welch asked for additional information about the noise impacts, noting it was easier to see the impacts on a map than on a graph. Mr. Nicosia-Rusin agreed to develop a geographic illustration for the next meeting. Ms. Welch also asked that slides show land areas for changes in runway utilization, and Mr. Nicosia-Rusin agreed to provide that information also.
- The presentation was stopped prior to the discussion of possible impacts from regional airports on the forecasts, for lack of time. Mr. Scarano noted the inadequacy of the time available for discussion and recommended that time be made available at the next meeting for additional questions on forecasting.

Observor Comments

- Gerry Falbo, of Winthrop, noted that he preferred to have community people respond to the issue of independent consultants, not those satisfied with the MassPort consultants.
- Steve Lathrop, from Hull, presented some research that showed airports with rapidly increasing emplanements also had increases in efficiency. He also expressed the view that the technical consultant needed to be either adversarial, with one for each view of the expansion, or a single consultant for the Panel as a whole.
- Anastasia Lyman, of the CAC, noted that the noise contours in the SDEIS are predicated on optimal use of PRAS. However, there is no assurance of optimal use, and the CAC is not in support of PRAS as currently used.
- Blossom Hoag, of the Sierra Club and CARE, noted that Massport's mailing to frequent flyers asking for their support of the runway was not constructive. She also asked if observors could have handouts used during the Panel meetings.

IV. **Next Meeting**

- The Panel identified the following topics for the next meeting.
  - Continue the forecasting presentation and discussion, including impacts of regionalization, geographic presentations of noise and runway utilization, and criticisms of forecasting components of the DEIS document.
  - Discuss regionalization, including an overview of the components, expectations for growth at regional airports, and impacts from increased use of rail due to high speed routes.
  - Whether and how the Panel should conduct meetings in locations proximate to affected communities.

V. The meeting adjourned at 6:40 PM.

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Panel

Minutes for Meeting No. 2
June 7, 2000

I. Agenda (See attached)

- The Panel convened at 3:00 PM

II. Attendees (See attached list)

III. Discussion

Organizational Tasks

- Mr. Scarano updated the Panel concerning FAA follow-up to the previous meeting. He noted that a web site has been established and the "Brown Book" will be available on it; that the Brown Book was distributed to ARC members, and letters went to local legislators describing the availability of the report. The summary of the significant public comments on the DEIS, with responses, was also distributed to Panel members.
- Ms. Orenstein reviewed the agenda, noting the proposed public comment period. The Panel agreed with the proposal.
- The Panel reviewed the summary of the April 26 meeting, and suggested the date be added in the heading. The minutes were accepted and FAA agreed to post them on the web site.
- Scheduling for future meetings was completed. The dates agreed upon are:
    - June 22, as a supplement to the June 7 meeting
    - July 13, 2:30 to 5:30 PM, at Manchester Airport
    - July 26, 4:00 to 7:00 PM
    - August 22, 12:30 to 3:30 PM
    - September 27, 4:00 to 7:00 PM
- The Panel reviewed the Procedural Guidelines, including Public Involvement Options. Mr. Rushing requested addition of several items previously discussed, including the agreement that materials would be provided to the panel at least 7 days before meetings and earlier if possible, and that all Panelists will receive any information requested by any panelist at the same time as the requesting panelist.
    - Mr. Egan asked if the schedule outlined in the guidelines, for completion of the Panel process by April 1, 2001, called for a Record of Decision (ROD) by that date. Mr. Scarano responded that the Final EIS will be available on that date subject to the progress of the scheduled meetings, and the ROD would be issued some time after that but could not specify any specific time because considerable internal FAA coordination would be required.

- In response to questions from the governors representatives to the mayoral representatives about a meeting held with the mayor and Jane Garvey, Mr. Egan proposed that all Panelists agree to forego advocacy with political leaders, press, and the courts regardless of the outcome of the Panel process. His suggestion was not adopted. Mr. Rushing suggested that a groundrule be adopted specifying that if any panelists desired to meet with political decision makers or the press, they would notify the rest of the panelists first. The Panel did not object to this suggestion, and Ms. Orenstein agreed to draft this provision for Panel review.
- Ms. Orenstein suggested, and the Panel agreed, to consider the Procedural Guidelines a working document that is open to revision as the Panel sees fit. <u>The Panel agreed that the Procedural Guidelines were accepted and should be posted on the web site.</u>

<u>Presentation on the Interim SDEIS - "The Brown Book"</u>

- John Silva, Manager of Environmental Programs for FAA New England, began the substantive presentations with an overview of the requirements for an EIS, and a description of the components of an EIS.
    - In response to a question from Mr. Tye regarding what action would not require an EIS, Mr. Silva noted that construction of a runway at a small airport where there were no environmental impacts might be an example of a federal action with no significant impact.
- Deborah Meehan, President of S, H &E, air transportation consultants, gave a detailed presentation describing the Draft EIS and the Interim Supplemental Draft EIS. She explained that the ISDEIS, or Brown Book, represents the effort to incorporate public comments that began prior to the inauguration of the panel. Ms. Meehan described the differences between the two documents, and noted that the Preface in the Brown Book was a good overview of the comparison and revisions in the Brown Book.
    - Comments and questions on Ms. Meehan's presentation included:
        - Page 18 of the presentation, which outlines the geographic distribution of Logan passengers, is not in the Brown Book. Ms. Meehan noted that it would be added.
        - Service between Worcester Airport and Atlanta was not included in the description of the service provided there. It will be added.
        - Lt. Governor Swift noted that there are many acronyms used throughout the Brown Book, and that they should be explained. The presenters noted that the Generic Environmental Impact Review for Logan includes a glossary. Panelists can request a copy of the GEIR from FAA or Massport.
        - Mr. Tye asked if there is an opportunity to move some of the small aircraft operations to another airport, and what could be done to reduce

the number of small aircraft carrying few passengers. He also requested data on all of the sources of delay, not just NW winds. These topics will be addressed in depth at the July and August meetings.
    - Ms. Welch noted that it was frustrating to have so much information presented without having the ability to question assumptions and give an alternative view. Mr. Scarano responded that as each component of the SDEIS is taken up in depth in future meetings, her questions and comments will be addressed in detail.

<u>Presentation on Forecasting Methodology and Results</u>

- Ralph Nicosia-Rusin, FAA Airport Capacity Program Manager, began a presentation on forecasting of passenger use and resulting operations projections for Logan Airport. His presentation was only partially completed, and will be continued at the June 22 meeting.
  - Comments and questions raised by Mr. Nicosia-Rusin's presentation included:
    - Mr. Butler asked about noise associated with the forecast, as related to Stage 2 and 3 fleet components.
    - Ms. Welch asked how increased regionalization would affect the forecasts. In response, the range of variation between forecasts, from 29 million passengers to 45 million passengers was described in more detail, to show that the current forecast range covers most likely scenarios.
    - Mr. Butler asked how consolidation of the airlines, such as the proposed merger between United and US Airways, was factored into the forecasting.
    - These questions were briefly considered as time allowed, and will be discussed in more detail on June 22.

IV. Observer Comments

- Steve Lathrop from the Hull Airport Committee, noted that overwater take-offs also go over Hull, sometimes at an altitude of 1500 feet. He also suggested that the preferred alternative be compared to current conditions, and that noise data in the DEIS is erroneous. He requested that the slide presentations be included on the web site.
- Ed Pignotti from the Boston Chamber of Commerce commented on the critical nature of the airport to the region's economy. He noted the need to solve the delay problems, and expressed support for significant improvements of regional airports.
- Blossom Hoag representing the Sierra Club and CARE noted the need for high speed rail improvement projects to include the link between North and South Stations, and noted that Chelsea is not the only area impacted adversely because the Harbor Islands also are subject to environmental and noise impacts.

- Bruce Thatcher asked when information will be on line on the web site, and was given the response that most is available now. He suggested that future Panel meeting dates be posted on the web site. He further noted that pilot non-compliance with Land and Hold Short Operations might increase delays. As a Roxbury resident, he is interested in Roxbury's receiving some focus regarding Logan impacts although Roxbury may not be impacted directly.
- Bernice Maider from the CAC spoke about the cumulative impacts that communities are feeling from the Big Dig, bridge construction, the convention center development, and development in South Boston. If air travel demand increases as predicted, there will be a need for more jets, which will fill the time available from delay reduction activities. She asked if there will be a guarantee on unidirectionality, and distributed clippings showing press coverage of Logan delays seldom, if ever, mentions the NW wind problem.
- Rick Rodes from CARE and a resident of Winthrop noted his community's concern about the centerfield taxiway, and its health effects. He further asked if other airfield projects would be considered in the Panel discussion, and it was clarified that the Panel will address all components of the alternatives discussed in the DEIS, not just runway 14/32.

V. Action Items

Task	Whom
Post final minutes for all meetings to date on web site	FAA
Post Procedural Guidelines on web site	FAA
Draft additions to procedural guidelines	Facilitator
Post meeting dates on web site	FAA

VI. Plans for Future Meetings

- The Panel agreed to meet on June 22 from 4:00 PM to 6:30 PM to continue the discussion of forecasting and begin the discussion of regionalization. Lt. Governor Swift noted that she would not be available for that meeting and encouraged the Panel to meet without her present.
- The meeting scheduled for July 13 will be held at the Manchester Airport, and will continue the discussion of regionalization. The Panel reviewed the regionalization issues outlined by FAA in the workprogram, and the issues raised by the mayoral appointees, and agreed that the meeting should include a focus on those items. The meeting will also include a tour of the Manchester airport and a briefing about its operations. This is all subject to coordination and approval of the Airport Authority.
- **VII. The meeting adjourned at 6:20 PM.**

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Process

Minutes for Panel Meeting No. 1A
April 26, 2000

I. **Agenda (See attached)**

- The meeting convened at 4:00 PM

II. **Attendees**

- John Butler was absent but he had previously noted he would not be able to attend. We had committed to date and in effort to avoid any further delay the meeting would be conducted in his absence. Because of his previous experience with the project this absence would not be significant to his understanding of this evenings activities.
- Mr. Joe Davies, ATCT Manager for Boston Logan was in the audience and introduced by the Chair.

III. **Discussion**

Agenda Item 1 - Review and Acceptance of the Minutes for March 28th.

1. **Introduction of the Facilitator**
    - Mr. Scarano introduced Ms. Suzanne Orenstein who had been retained to facilitate the Panel proceedings.
    - Ms. Orenstein provided a brief resume of her previous experience.
    - She noted that she had attended the first Panel meeting.
    - She stated that she will strive to speak to Panel members between meetings to ensure that all their concerns are being properly understood and communicated.
    - She went over her role saying she would ensure that everyone is heard and the meeting is run efficiently.
    - All members had been previously provided a copy of her resume and the scope of her services on this project.
    - Ms. Welch asked for the difference between the Chair and Facilitator. Ms Orenstein responded that the Facilitator:
        - Ensures that the conversation is balanced and remains focused.
        - Works for the entire panel, including one-on-one meetings.
        - Is not a mediator in the process.
        - Keep ensures that the meeting stays on schedule and runs efficiently.

      Basically the Chair introduces the topic and the facilitator facilitates the discussion. The Chair would also be the position to make decisions on certain issues and Panel suggestions that arise during the discussions.
    - Mr. Scarano stated any reasonable suggestions to assist the facilitation would be reviewed and added to the scope.

2. **Review of Minutes**
    - Mr. Tye questioned who prepared the Work Program and the schedule. He noted it appeared "capped". Mr. Scarano clarified that the Work Program was prepared in response to Lt. Governor Swift's request for a schedule at the March 28th meeting.

The program summarized the activities ahead in a narrative format. The Panel prior to each meeting will develop each issue in more detail.

- Mr. Tye also asked for a copy for the DEIS "Response to Comments. The FAA acknowledged they would provide this information at the next meeting **(noted as an IOU Item).**
- At Lt. Governor Swift's suggestion the minutes will be amended to reflect that a FEIS will be ready in approximately 12 months.
- Ms. Welch added that should be a schedule we hope to attain but it is not a commitment.
- Mr. Egan brought the frequency of meetings and the need to move through the topics quicker than proposed in the Work Program. Mr. Scarano responded that the monthly frequency was necessary to prepare for each meeting.
- The Chair anticipates the Final EIS to be published in 12 months.
- Panel concurred to tentative schedule based upon reasonable accommodating any significant issues that arise and with the understanding that if a topic runs over the scheduled time a supplementary meeting will be scheduled rather than allowing unfinished business to push the work program out in time.
- The Lt. Governor asked what the Minutes would be used for - are they part of the official record? Mr. Scarano responded by saying that the Minutes would be used to capture the important points and decisions for FAA to use to prepare the best possible EIS.
- Lt. Governor then for a clarification on a statement about the Interim SDEIS at the end of the Minutes (Page 4): re: FAA was active part of in of the Report review?
- Mr. Tye wanted to know if FAA was endorsing the conclusions of the interim SDEIS report.
- Mr. Scarano said no but acknowledged that the FAA probably said at the March 28th meeting that the effort went well beyond what was typically required in an EIS. He also acknowledged that the statement at the end of the March 28th Minutes was an added after the meeting after he deliberated on the subject.
- There was agreement that the idea of adding notes after the meeting should be treated differently.
- Mr. Egan requested that the minutes be amended to reflect the fact that: The FAA stated that the report went well beyond that which is required that the FAA read the report and had no arguments with it. The FAA acknowledged to amend the minutes to reflect the position noted at the March 28th meeting **(noted as an IOU Item).**
- Mr. Egan requested that the Facilitator review the Minutes prior to distribution to the Panel.

Agenda Item II - Public Process and Overview of the Issues

1. **Public Process**
    - Mr. Scarano introduced the topic and indicated the items noted on the agenda forwarded to the Panel were suggestions and by no means a requirement. He was open to all Panel suggestions.
    - Ms. Welch stated the Panel needs to hear suggestions on topics and share information with the public.

- Lt. Governor Swift said that the final product needs to have credibility – open and considerate of all views.
- Mr. Egan said the document needs to reflect traveling public in general.
- Mr. Tye said public input is what it's all about.
- Ms. Welch noted that public meetings need to be accessible by public transportation.

Discussion of public meetings topic by topic versus after several topics ensued.

- Lt. Governor Swift said that public input at the end of the process would be helpful and that people have strong views that may be changed.
- Mr. Egan felt that public meetings would not be helpful unless there were new things because the issues have already had a public forum.
- Mr. Tye said he would invite public input and that he needs much more information. He asked that Ms. Orenstein decide how public involvement should be carried out. <u>She noted the request **(It is listed it as IOU item).**</u>
- Rep. Cushing said that credibility was important and since not everyone has had the opportunity to provide input on issues that the Panel may frame, e.g., regionalization.
- Lt. Governor Swift talked about a web site for public input. Rep. Rushing seconded the idea and said he also favored face to face meetings.
- Mr. Tye and Ms. Welch agreed on asking the facilitator to work on the public process.
- Lt. Governor Swift and Mr. Nicosia-Rusin spoke about the need to use public meetings to inform and educate, with the idea that FAA has to decide on the issues.
- Ms. Orenstein summarized the thoughts on this subject of public process.
  - There was no unanimity on the need for public involvement.
  - Use the facilitator to work on a public process plan.
  - Public already well exposed.
- Ms. Welch said that more public involvement is needed because Interim SDEIS is very different from previous Draft EIS.
- Rep. Rushing said Interim SDEIS could be distributed to libraries, ARC and on the Net.
- Ms. Welch said that politicians needed it.
- Mr. Scarano expressed a concern that FAA would begin receiving comments from those who would obtain a copy of the report and would have to respond to those comments. This issue could be covered in a cover letter that could accompany the document.
- <u>There was agreement to offer the Interim SDEIS (Brown Report) to communities.</u>

Topic shifted to overview of the issues (view graph of prospectus issues was shown on screen).

- Ms. Welch introduced a list of additional potential issues (The Panel was given a copy.) was developed in conjunction with Mr. Tye and Rep. Rushing that should be addressed in the SDEIS. (See note below on same subject.)
- Re: Item I – Induced Demand , Capacity. Lt. Governor Swift said some items on the list might be covered by FAA's list. Need to work items into Work Program.

- Discussion of issues within existing agreements, e.g., Can additional traffic be handled in accordance with the parking freeze?
- Rep. Rushing would like to discuss "off line" EJ and DOT policy reference their E.J issue.

Agenda Item III - Agenda for Panel Meeting No. 2

1. **Discussion of schedule.**
   - Agreement that schedule is tentative for production of FEIS in 12 months.
   - The dates were agreed to for meetings through Meeting No. 4. They were:
     - May 31, 2000 at Volpe TSC 4:00PM - 6:30PM
     - June 22, 2000 at Volpe TSC 4:00PM - 7:00PM
     - July 26, 2000 at Volpe TSC 4:00PM - 7:00PM

     Dates for Meeting No. 5 and 6 would be revisited.
   - Mr. Scarano said FAA would integrate the primary issues presented in Ms. Welch's supplemental paper into the Work Program where FAA thought they could best fit. In preparing the issue for the next meeting we would discuss the plausibility of actually assessing the individual topics as part of the Work Program.
   - There was agreement to move aviation forecasting from meeting No. 3 into the next meeting, Meeting No.2 - Overview of the EIS.
   - Ms. Welch requested that the presentation include the differences between the DEIS and the SDEIS.
   - Mr.Nicosia-Rusin suggested that the next meeting include a description of how forecasts affect environmental impacts. He also suggested presentation of forecasted demand around a "sensitivity analysis" to determine how significant changes are as a result of those forecasts.
   - Ms. Welch spoke to the desirability of having their consultant present at the net meeting.
   - Mr. Tye expressed the need to have the most credible information.
   - Mr. Egan objected to listening to the CAC's consultant.
   - The CAC consultant may be making a presentation on forecasting at the next meeting.
   - Ms Orenstein summarized the IOU's for the next meeting.
     - Reserved
     - Reserved
     - Reserved

Prepared by V.Scarano April 30, 2000

Boston Logan International Airport
Supplemental DEIS Process

Revised AGENDA
Meeting No. 1[1]

March 28, 2000
5:15 PM - 8:00 PM

Massachusetts Transportation Building
Conference Room No. 1 on the 2nd Floor

1. Introductions

2. Opening Statement

3. Logistics for Future Meetings
Frequency, Day and Time, Length of Meetings, Location, Guidelines, Facilitation

4. Roles and Responsibilities of FAA, Panel, Massport, Public

5. FAA Overview of Existing Planning and DEIS Process.

NOTE: The following items were not discussed and deferred until the next meeting in approximately 2 weeks.

6. General Review of the FAA Prospectus (Deferred to Meeting 1A)
   - Public Process: Providing Input and Disseminating Information
   - Issues: See Prospectus - Section V

7. Agenda for Next Panel Meeting. (Deferred to Meeting 1A)

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[1] Revised Agenda effective March 28, 2000

Boston Logan International Airport
Supplemental Draft EIS (SDEIS) Process

Minutes for Panel Meeting No. 1

I. Agenda (See attached)

- The meeting convened at 5:15 PM

II. Attendees (See attached)

III. Discussion

Introductions:

- Mr. Scarano introduced himself and acknowledged several others in the audience (Derosier and Leo, Massport, Higgins, EPA, D'Amico, City of Boston Transportation, Dusseault, Borgioli, ATCT, Flieger and Harris, FAA Air Traffic.
- The Panel introductions were Lt. Gov. Jane Swift, Ray Tye, State Rep. Byron Rushing, Mary Ellen Welch, John Butler, and Dick Egan, Panel Members, as well as Ralph Nicosia-Rusin and John Silva, FAA Airports and Panel Technical Support staff

Opening Statement

- Mr. Scarano read his opening statement (See attached).
- Rep. Rushing noted that Mr. Scarano's reference to Ms. Garvey's citation omitted a phrase. (The attached statement has been annotated to include the phrase inadvertently omitted.)

Logistics for Future Meetings

- Mr. Egan suggested the meetings be held every 2 weeks to expedite.
- Lt. Gov. Swift also asked whether it would be possible to hold frequent meetings to expedite the process and what FAA anticipated as a time frame to complete the process.
- Mr. Scarano highlighted:
  - It was expected that it would take 10 - 12 months and it would be difficult to schedule meetings with an interval less than 1 per month.
  - Preparation for meetings, especially when new material was required was a factor.
  - He also highlighted that it would take at least 10 meetings.
  - The time frame also included specified time required (a) to comply with the NEPA process and (b) respond to comments provided during the public review process. The DEIS process took 2 months to respond to public comments.
- Mr. Egan asked that the process and that all meetings be recorded.
- It was accepted that minutes would be recorded and FAA would consider tape recordings for subsequent proceedings.
- Mr. Scarano noted that FAA was going to provide a Facilitator and would be available for the next meeting. Rep. Rushing noted that no future meeting should be scheduled until the Facilitator is on board. We all concurred with this point.
- Ensuing discussion about the Facilitator's role followed. It was agreed that FAA would provide the Panel with a position description.

- Acknowledging his limited awareness of many of the issues associated with this Boston Logan issue Mr. Tye asked that all information be provided in sufficient time to prepare for subsequent meetings.
- Mr. Scarano offered to meet with him or any Panel member separately and brief them on the subject. It was agreed that FAA would provide an agenda and any associated material in sufficient time to prepare for all meetings.
- Mr. Egan asked whether the Panel should establish a policy about speaking with the media.
- Mr. Scarano suggested that the Panel should consider this, but he was not adverse to media being present at meetings because it was a form of a public process.
- The panel reached a consensus that as a Panel, they would only issue statements with unanimous consent.
- Mr. Egan inquired as to the format of the meetings and the possibility of the Panel meeting in private to facilitate more expression of ideas.
- Mr. Tye commented that the dialogue held throughout this process would speak for itself.
- Rep. Rushing observed that this discussion reflected a concern about "trust" in the process and this was why a Facilitator was required.
- Mr. Scarano replied that he was uncertain about the legal requirements for a public meeting, but felt that the process would benefit more by keeping it open.

Roles and Responsibilities

- Mr. Scarano requested that the Panel discuss their views of their "roles" and responsibilities. Rep. Rushing concurred that it would be good but requested that Panel have an opportunity to return to this topic after a facilitator has been brought on board.
- Lt. Gov. Swift felt that her role had already been well defined by Ms. Garvey's letter to the Governor. Rep. Rushing concurred with the Lt. Gov.
- Mr. Egan spoke about regulations covering the adequacy of the document and whether the Panel's role should determine such, and perhaps regulations should determine the Panel's review and not the quality of the document. He also wished to know what other SDEIS had been completed elsewhere in the U.S., as well as when and how.
- Mr. Scarano replied that for the most part there were no specific regulations as to how this process should be conducted but that other airports had conducted supplemental studies and that each was unique to their specific needs. The FAA accepted his request as an IOU.
- Ms. Welch suggested that public meetings could be held at certain delegated points in the future, each using a community involvement consultant. Meetings should be held to cover more limited topics as the FAA develops the SDEIS. She stressed the point that there was a definite need to coordinate all information with the public.
- Mr. Scarano noted that these were items on "Public Input and Dissemination" and suggested the discussion be deferred until that topic was raised. **Note:** Because the Panel meeting was concluded before that agenda item was reached the topic was deferred to the next meeting. Ms. Welch's point warrants a full discussion at that time.
- All Panel members agreed to address the need for public involvement at the next meeting.

- The other item on the agenda not discussed this evening was the framing of the issues highlighted in the Prospectus attached to Ms. Garvey's letter to the Mayor and Governor. Moreover, Mr. Scarano asked whether the Panel concurred that those issues are generally the general concerns expressed by the public during the DEIS process.
- Mr. Scarano cited as an example of framing an issue for the next meeting the discussion of the new runway would have to include examining the adequacy of its length in light of the introduction of regional jet technology and growth.
- In response to questions as to whether these issues have already been resolved Mr. Silva added that information from the consultants would be given to the Panel. We view this as a starting point but anticipate the need to clarify and in some cases expand the analysis.
- Ms. Welch reiterated that independent consultant rather than one consultant might be more beneficial to the panel and FAA should consider her request. This topic was discussed at some length with others noting that the Panel had to be the best source of values and judgement.
- Ms. Welch also asked for a commitment that experts would be available to the Panel.
- Mr. Scarano responded that his opening statement contained a commitment that if the Panel felt additional analytical work was necessary the FAA would consider it. He also noted that FAA would rely on Massport to provide the resources to conduct additional work.
- Lt. Gov. Swift made the point about Massport credibility. She made the recommendation that the Panel not require resources to be spent on providing additional information if the Panel would not commit to accepting the credibility of the source of the data prior to reviewing the results.

FAA Overview of Existing Planning and DEIS Process

- This was a slide presentation by Mr. Scarano generally highlighting:
  - The planning since 1991 leading up to the decision by Massport to pursue the environmental process for a new runway.
  - How that environmental process (NEPA and MEPA) proceeded to date.
  - Where we are at the start of this SDEIS and what will occur from this point to conclude with an EIS and Record of Decision (ROD).
  - It also noted the Panel's role in that process and where it concluded.
  - The panel will help guide our response to the comments received during the formal public process on the SDEIS and before we prepare the Final EIS.
  - The point that this was strictly a Federal process.
- The Panel requested and received a copy of the slide presentation.
- There was also a specific request for a copy of the "New England Service Study" that was referred to in the Planning slide presentation. FAA accepted this as an IOU.

General Review of the FAA Prospectus - Public Process and Issues
Agenda for Next Panel Meeting

- To conclude the meeting at the 8:00 PM scheduled time all agreed to reconvene in about 2 weeks to complete discussion of both these items. The Panel agreed to send schedules to FAA for identification of a mutually convenient time and date.

- Lt. Gov. Swift asked that the FAA develop and furnish the Panel with a Work Plan for all subsequent meetings. FAA accepted this as an IOU.
- To conclude the meeting FAA provided each member with the Interim SDEIS, reminding each member to refer to the FAA opening statement regarding the FAA position on this document.
- In deliberating the issue of the report after the meeting the FAA is incorporating an additional statement for the record.

  The FAA was an active participant in reviewing the report and was instrumental in commenting and suggesting changes to its content. Notwithstanding that fact, the Panel should not assume from its content that the FAA has adopted, either in part, or as a whole document the final conclusions. In preparing the Final EIS the document will be subject to changes based on the SDEIS deliberations with the Panel and the responses received during the final public comment process.

IV. IOU's

- The following is the status of the IOU's developed at this meeting.

#	Item	By	Remarks
	IOU's Meeting #1		
1.	Copy of FAA Statement	FAA	Copy Attached
2.	Copy of Minutes for Meeting No.1.	FAA	See Above Notes
3.	Provide draft Work Plan for Mtgs.	FAA	Work in Progress
4.	Copy of NE Air Service Study	FAA	Copy Attached
5.	Copy of Slide Presentation on Planning Studies and NEPA process.	FAA	Provided at Meeting
6.	Other Examples where a "supplemental process" utilized • Where, When, How?	FAA	Work in Progress
7.	Copy of PD for Facilitator.	FAA	Work in Progress
8.	Copy of original SDEIS.	FAA	Work in Progress
9.	Provide Scheduling Information to FAA	Panel	Information Pending
10.	Schedule Meeting No. 1A to Complete Agenda	FAA	Work in Progress

The meeting concluded at 8:00 PM.

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Minutes prepared by FAA April 3, 2000[1]

[1] The minutes will be reviewed, discussed and accepted as part of the Agenda for Meeting 1A.

Subject: Boston International Airport Supplemental DEIS Process - Meeting No.1 March 28, 2000.
Opening Statement by Vincent Scarano, FAA, Airports Division, New England Region

1. COMMITMENT

When the administrator asked me to serve as the Chair for this Panel it was a matter of great personal and professional pride. I am asking you to trust me and to seek out the answers to your questions during this process from my office. In serving in her behalf I am committed to:

- Guiding the panel and ensuring that we stay focused on our purpose.
- Making this an objective process.
- Understanding all viewpoints.
- Making no decisions about the environmental process until we have completed the process.

2. PURPOSE

The Panel is asked to confront this controversial R/W project by engaging in a fair and open process with the hope of:

- Helping FAA understand all viewpoints.
- Sharing your insights.
- Discussing, evaluating, understanding and perhaps even reconciling divergent views.
- Suggesting alternative approaches.
- Providing information to the public.
- And finally counseling and guiding the decision-makers to find the right solution.

In some respects this process is more then influencing a decision on whether or not to build Runway 14-32.

- Either choice will influence decision-makers on transportation policies for Boston, the region and even the national airport system.
- Equally important is the fact that either way you create environmental choices that impacts the communities and region positively and negatively.
- Finally, decisions about Logan Airport also impact the economic development of Boston and the region.

Therefore in progressing through this process you need to think broadly about the airport issues and impacts and not just about building or not building a runway.

3. THE PROCESS

This process is about the panel working with FAA.

- The starting point for our discussion is the interim report that will be provided to the members tonight. Whether you agree or disagree with its content, it is a data source from which to develop an understanding of the information to date.[1] Please do not get hung up on what it is called.

The existence of this report does not mean that:

- The process will be limited to the existing information.
- Limited to analyses and evaluations that have been completed.
- Issues or options that warrant additional assessment or review will certainly be a consideration.
- FAA will call upon the panel's viewpoint before making a decision about performing new work.
- If there is evidence that another consultant should conduct the analytical work FAA will also take that under consideration.

This is a FAA environmental process and we are following the National Environmental Policy Act process and therefore:

- Ultimately we will prepare a supplemental DEIS that will be made available for public comment.
- The process will conclude with FAA issuing a final EIS and ROD.

4. TRUST

The lack of it has continually plagued the relationship between the community and aviation interests. Therefore, in my role as Chair I am adding one more commitment and that is:

- To ensure that trust and credibility will not become an issue jeopardizing the validity of this process.
- There may be differences of views but it will be based on honest opinions on how a fact is viewed.
- Creating an open process will be one the first subjects of tonight's meeting.
- How we provide information to the public will be a first step in creating a positive attitude on trust.

5. IN CLOSING:

For this process to be objective it is also critical that there be a balance in our thinking. It is best expressed by referring to Jane Garvey's personal statement to the Governor and Mayor on February 10th.

> "For this process to succeed, those who believe that r/w 14-32 can play a positive role in improving Logan must be prepared to help **identify the other parts of a reasonable solution**[2], to consider mitigation that can eliminate any negative impact and be prepared to consider that there may be alternate solutions that do not include a runway. Those who have opposed the runway need to clearly identify concerns and be prepared to consider that there may be an acceptable package of actions that includes the runway."

The challenge therefore is for all of us to move the process forward in the spirit of commitment and compromise.

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[1] Refer to the Minutes Mtg No.1 (page 4) - an additional comment concerning the FAA position on the Report is noted.

[2] The section in bold print was inadvertently omitted during the reading of the statement to the Panel on March 28th

SDEIS Panel Questions

Questions Submitted by Mary Ellen Welch, Logan SDEIS Panel Member

#	Comment	Response
1.	May this panel have the T.F. Green forecasts? In fact, may we have the marketing forecast and analysis from the Manchester, Worcester, Green, Pease, Portland, and Bradley airports and have a FAA presentation to compare with the Logan forecasting of market issues?	Appendix B of this Supplemental DEIS/FEIR presents all available planning forecasts and a summary of predicted environmental impacts for the regional airports that surround Logan – T.F. Green, Manchester, Hanscom and Worcester. Chapter 2 of this Supplemental DEIS/FEIR describes Massport's marketing forecast for the Worcester Airport.
2.	Could we have an explanation of the differences between the M.P.A. delay model and the FAA delay model? The delay numbers are different. Why?	Appendix C of this Supplemental DEIS/FEIR describes measures used by the FAA and US DOT to assess delays at airports, the limitations of those measures, and the use of simulation models for estimating delays. Chapter 1 of this Supplemental DEIS/FEIR compares delay simulation estimates produced by the FAA's delay model to estimates produced by the DELAYSIM model used for the Airside Project analysis. Chapter 4 of this Supplemental DEIS/FEIR contains a discussion of the models used by the Airside analysis to estimate delays. The Logan Airside modeling includes only those delays produced by conditions at Logan, and it tallies all delays experienced by Logan traffic.
3.	What will be the projected number of all flight operations off of all runways in 2010? Could we have them listed by runway in a scenario with 14/32 in place?	This Supplemental DEIS/FEIR provides forecasts for a range of future, long-term activity levels. The projected number of flight operations by runway end and project alternative are presented in Appendix E. While the Draft EIS/EIR attributed these forecasts to 2010, the impact of the regionalization suggests that Logan will not reach these levels until 2015. A new 2015 scenario which contains a higher number of regional jets is fully analyzed in the Supplemental DEIS/FEIR
4.	Alternative 2 (no 14/32) is left out of the SDEIS as a feasible and prudent alternative. Why?	The Airside Project Draft EIS/EIR presented detailed results for all project alternatives for all forecast fleets. This Supplemental DEIS/FEIR contains detailed results for a range of fleets comparing the Preferred Alternative to the No Action Alternative. The comparison is limited in this Supplemental DEIS/FEIR in order to focus attention on the relevant analysis. In this Supplemental DEIS/FEIR the results of all Alternatives, including Alternative 2, are summarized in the Appendices: Appendix C contains operational results, Appendix E contains noise results, and Appendix F contains Air Quality results.

#	Comment	Response
5.	Reinstate alternative 2 for a comparison study so the public can understand, and the impacts of 14/32. Without the comparison there is no demonstration of those populations that would receive increased impacts if 14/32 is built.	See response to Question 4. The new analysis of the high regional jet fleet in the Supplemental DEIS includes Alternatives 1 and 2, as well as the No Action and Preferred Alternatives.
6.	PRAS is used in ISDEIS to plan for a shared noise model. PRAS has not been used by the tower most of the time.	Chapter 4 of the Supplemental DEIS/FEIR provides an evaluation of PRAS performance using existing measures for monitoring PRAS and demonstrates that the FAA has improved its performance relative to the PRAS goals. The analysis also shows that Runway 14/32 will substantially enhance the FAA Tower's ability to increase PRAS performance with respect to both annual and short-term goals. The Preferred Alternative (Alternative 1A) mitigation program includes additional reporting requirements recommended to enhance the monitoring efforts.
7.	Contours should be re-done reflecting the use of PRAS to reflect reality. PRAS needs to be re-worked with an approved minimizing overall noise before sharing noise in a system model. May we have information, analysis demonstration, and presentation of this?	The goals of the Airside Project are to reduce delay, increase the airport's efficiency and improve airfield safety in an environmentally responsible manner. In addition to reducing delays and improving efficiency, Runway 14/32 would also give the FAA air traffic controllers considerably more flexibility, which would allow them to improve achievement of PRAS goals and redirect many flights over water and away from close-in communities. The addition of Runway 14/32 would be the single most important mechanism for achieving a more equitable geographic distribution of aircraft operations. While more people are added to the more distant contours (60 and 65 DNL), the close-in populations achieve substantial relief (70 and 75 DNL). Without the proposed runway, demand at Logan will increase the airport's reliance on Runways 4 and 22, disproportionately impacting communities north and south of the airport.
8.	In 98 – 99, operations are down. Delays are down by 6%. Other airports, Detroit & Denver, both with 5 runways, have increased delays. 118% → Detroit Both have 500,000 plus operations, 43% → Denver	Depending on wind, weather and demand, delays at Logan will vary from year to year. Regardless of the annual variation in the number of delayed flights reported by the FAA, Logan remains one of the most delayed airports in the country. Logan is more severely delayed than either Detroit or Denver. For the year cited, 1999, Logan was the 7th most delayed airport, while Detroit ranked 10th and Denver was 29th. Further, Logan experiences significantly more delays per aircraft operation than Detroit or Denver. In 1999, there were 30 delayed flights at Logan for every 1000 operations, compared to 21 for Detroit and only 3 for Denver. Analysis in Chapter 4 demonstrates that if Runway 14/32 were available in 1998, Logan delays would have declined by 32 percent.

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9.	Logan is decreasing in delays on its own. Why?	Refer to Question 8.
10.	In the discussion on fleet mix, it was stated that 45% of the fleet are 9-18 seat turbo prop airplanes. This 45% of the fleet serves 10% of the total passengers. Where is the analysis of a plan to minimize the 45% mix? Generic EIR, '98; Passengers increased 3.8%; Aircraft increased 5.2%	The most recent growth trends at Logan show declines in operations with increases in passenger traffic. In 2000, total operations fell by 3.2% while passengers grew by 1.3%. The average seat size of regional/commuter turboprops (with 9-50 seats) has steadily increased. Moreover, the number of non-jets has begun to sharply decline; in 1999, the non-jets comprised only 39% of Logan operations. In the Supplemental DEIS/ FEIR, a new "High Regional Jet" fleet is analyzed for 2015. In this fleet, turboprops account for only 11% of the fleet while regional jets account for 32%.
11.	May we see demand management techniques from other airports as an approach to curb this unbalanced growth? And could it be done before a new runway is decided on to test it?	Section 3.5.2 of the Supplemental DEIS includes a summary of demand management techniques that have been proposed or implemented at Logan and other airports. Due to the increased congestion that developed at New York's LaGuardia Airport after the AIR-21 legislation last year, the FAA is developing a new demand management policy that will be implemented at LGA in September 2001, and which will provide guidance for other US airports such as Logan. It is important to recognize that demand management (e.g. Peak Period Pricing) and proposed Runway 14/32 address very different delay problems at Logan. Unidirectional 14/32 is designed to reduce delays due to Northwest Winds. It does not represent an increase in Logan's total capacity; rather, it helps Logan maintain capacity when the winds are from the Northwest. On the other hand, Peak Period Pricing is a demand management technique that addresses the problem of airline overscheduling. Massport is committed to implementing a monitoring program, and, if demand conditions warrant, a Peak Period Pricing Program. Other demand management techniques, such as slots or operational caps, are not within the purview of Massport and therefore do not represent realistic alternatives.
12.	'98 comparison for a base seems unfair; 87% of the fleet was Stage 3. Reduction would be 3db if it had been fully compliant. Would this be or make a difference in comparing '98 contours to a future with all stage 3s? Could you program the INM to produce a contour using '98 fleet without stage 2s? This would seem to be fairer for future contour projections for E.J.	Throughout the Airside documents, the relevant comparison for environmental and delay results is Action to No Action within the same fleet. Comparisons across years can be informative, but are not useful for deciding which project alternatives are appropriate for achieving delay reduction benefits, nor what their relative environmental impacts are.

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13.	How will the new terminal developments affect airspace capacity, new gates, increase of traffic impacts? Will they affect fleet mix and operations?	These modest changes are expected to increase operating efficiency and level of service somewhat, but to have no impact on passenger levels, ground traffic, fleet mix or number of operations. The terminal developments envision a few additional gates, but a reduction in aircraft parking positions.
14.	How will ground access improvements affect future passenger levels, e.g. Big Dig, South Boston Waterfront.	Major ground access improvements from Boston to an alternative airport or to a major air market, such as New York, are the types of ground access improvements that could impact Logan passenger levels. The Airside analysis takes into account improved access to Providence Airport via rail and high-speed rail access to New York (Amtrak's Acela service). Both of these ground access improvements have a dampening effect on the projected growth in Logan demand. Other ground access improvements have an impact on mode choice to and from the airport, but not impact the decision to use Logan.
15.	Pg. 4-1, 4th bullet. Why did 1999 29M low fleet mix change regarding % of jet operations that would utilize 14/32?	With the improvements of the Preferred Alternative, 52,000 additional jet operations occur over water compared to the No Action Alternative.
16.	The DEIS stated: "75,000 operations (52,000 jet ops.)." The ISDEIS states that out of the 75,000 ops there will be "32,000 jet operations" using 14/32. What changed and why?	See response to Question 15.
17.	Alternative 2 seems to offer an additional 45,000 hours of delay reduction compared to Alternative 1A in the DEIS, Table 4, pg. 6-3, High Fleet Scenario. Why? How does the forecasting address this? There is a need for additional analysis and presentation.	In high fleets, both Peak Period Pricing and the runway result in significant reductions in delay. In low fleets, Peak Period Pricing has almost no effect on delays because airline over-scheduling is not a primary cause of delay in these scenarios. Massport is committed to Peak Period Pricing, along with the runway and taxiway improvements, if Logan begins to suffer from over-scheduling.
18.	When you do forecasting what % of the delays are due to: longer aircraft separation; schedule demand / over-scheduling; air traffic control procedures; noise abatement rules; other restrictions, e.g. weather.	The proposed Airside Improvements address those delays that Massport can expect to reduce at Logan. Figure 4.6-3 of the Supplemental DEIS compares the breakdown of delays during VFR and IFR weather conditions. It also demonstrates the effectiveness of the Preferred Alternative in reducing VFR delays. Reduced Minimums also provide a small reduction in IFR delays, but in general there is little that can be done at Logan to reduce these delays. Figure 4.6-1 shows the VFR delays for 1998 by wind direction, and the dramatic benefit that Runway 14/32 would have on northwest wind delays. Similar data for the new 37.5M High Regional Jet Fleet is presented in Figures 4.7-4 and 4.7-5. Delays due to airline over-scheduling can be estimated by comparing Alternatives 2 and 4 in Table 4.5-3 of the Draft EIS/EIR, and in Table 4.7-2 of the Supplemental DEIS/FEIR. Air

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		traffic control separations and procedures were developed by the FAA to maintain safe aircraft operations, and cannot be modified by Massport.
19.	How do these compare to NW wind situation?	Refer to response to Question 18.
20.	What % of the "wake turbulence separation" restriction decreased capacity and increased delays?	In August 1996, the FAA changed the aircraft weight categories used to determine wake vortex separations, and increased the separation between B757s and Small (mostly turboprop) aircraft. With Logan's fleet mix at the time, this resulted in a shift of 12% of Logan's operations from the Large category to the Small category. This increased the approach separations of these aircraft by 1 to 1.5 miles behind Large or B757 aircraft. When Logan is able to use three runways, the Small aircraft are normally assigned to a different landing runway than the jets, so the effect was most important during northwest winds and under IFR conditions. Since 1995/96, the number of Small aircraft at Logan has declined as airlines have replaced them with larger and heavier equipment.
21.	(From Feb. 1999, Draft EIS/EIR, pg. 4-33) (45,000 less hours of delay with Alt. 2)	Refer to response to Question 17.
22.	Could we have a graphic showing the kinds of delays compared to each other, e.g., NW winds vs. other weather delays vs. over-scheduling vs. other airport delays causing Logan delays?	Refer to response to Question 18.
23.	Analysis of all existing and potential delay-reducing FAA air traffic demand management and flight procedures.	The FAA is always studying new procedures to reduce delays. However, there is no technique or management tool that replaces the need for Runway 14/32. The proposed runway is designed to reduce delays in Northwest wind conditions when Logan drops from a three-runway configuration to a two-runway configuration, and occasionally, in severe winds, to a one-runway configuration. A summary of ongoing FAA measures to reduce delays nationwide is presented in Chapter 1 of this Supplemental DEIS/FEIR.
24.	Comparison analysis of same-size airports with similar wind and weather delay-creating factors.	Chapter 1 of this Supplemental DEIS/FEIR compares reported delays at Logan to delays at other similarly sized airports, including northeast airports subject to similar weather conditions.
25.	Comprehensive analysis on runway length and acknowledged intent to use 5000' runway from all airlines using Logan.	Research by the FAA consultant indicates that the proposed 5,000-foot runway is adequate for all turbo-prop, most general aviation, and most regional jet types forecast to operate at Logan. The report of the FAA consultant is contained in Appendix C of this Supplemental DEIS/FEIR.

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26.	When you're doing the forecasting, how much regionalization do you include?	To account for the uncertainty associated with any forecasting effort, the Airside analysis considered a range of future passenger and aircraft operation levels. One of the factors that cause this variation is the success of regionalization. In this Supplemental DEIS/FEIR, Massport extended its forecast of 37 million passengers from 2010 to 2015 to reflect the observed impact of regionalization on Logan's growth trend. Chapter 2 of this Supplemental DEIS/FEIR describes the impacts of regionalization on Logan's future demand levels.
27.	What are your methods for dealing with uncertainties, e.g. In Chapter 4 delays, MPA and FAA admit their forecasts are inflated (pages 4-7 and 4-8) as much as 10% above actual '99 operations and off by 2.5 of passengers forecasted for 2010. These forecasts are the same ones used to compare the alternatives and push 14/32.	To account for the uncertainty associated with forecasts, the Airside analysis considered a range of future passenger levels from 29 million (expected to be reached in 2003) to 37.5 million (expected to be reached in 2015), and 45 million (expected to be reached around 2024). Furthermore, the results of the Airside analysis indicate that the delay reduction benefits of the Preferred Alternative are not dependent upon the forecast passenger levels. On the contrary, if the elements of the Preferred Alternative had been available to Logan users in 1998, annual delays hours would have been reduced by 32 percent (Refer to Chapter 4 of this Supplemental DEIS/FEIR).
28.	Please explain, on pg. 4-8, 1st paragraph: "In terms of the hourly demand profile, the 1998 profile has significantly less peaking than the 29M forecasted fleets. The late afternoon peak period in '98 has fewer operations and is shorter than the peaks in the near term forecasts. The '98 demand is "flatter" and produces fewer delays than the 29M high and low profiles.	The shape of Logan's demand profile (hourly arrivals and departures) has an impact on delays. Higher and longer peak periods of aircraft demand result in more delays. Chapter 4 of this Supplemental DEIS/FEIR provides a detailed description of the changes in Logan's demand profile.
29.	Pg. 4-11: During '99 Logan had moderate 20% growth in passengers despite a 2.5% decline in operations. Pg. 18, 2nd paragraph: "In '99 there was a 1.9% increase in passengers." Why is this? Why the difference?	In 1999, Logan passengers increased by 2% over the 1998 passenger level (Note that the 20% reported in the comment and 1.9% on page 4-18 of the Interim Supplemental DEIS distributed to the Panel are typographic errors). Changes in passenger demand are largely a function of changes in economic conditions. As economic conditions improve, passenger demand increases. Changes in the number of aircraft operations can be caused by competitive factors and carrier fleet decisions, as well as other factors. It is generally true in the air transportation industry that the growth in passenger demand outpaces the growth in operations. This is because growth in passenger demand is accommodated through higher load factors or larger aircraft.

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30.	If operation levels are rising minimally and passenger levels are declining, thereby impacting forecasts, why the rush for a new runway?	The FAA consistently rates Logan Airport as one of the most delay-prone airports in the United States. The proposed unidirectional Runway 14/32 is designed to reduce delays caused by Northwest winds. Runway 14/32 has no impact on delays that result from increases or decreases in airline schedules. Despite the reduction in aircraft operations in 1999 and 2000, Logan was the 7th most delayed US airport in both years. Please refer to Chapter 1 of this Supplemental DEIS/FEIR for a discussion of delays caused by Northwest winds.
31.	How do you factor into the air passenger predictions for Logan the fact that it is full? Terminals are full, curbs are full, and it's hard to park or get a cab. How do you determine capacity with passenger forecasting?	The ESPR, which Massport files annually with MEPA, confirms Logan's ability to accommodate increases in passenger demand for the foreseeable future. The ESPR describes on going and proposed improvements at Logan in terms of terminals, parking, ground access, etc. The Airside Project utilized a wide range of activity levels, including current and future levels. The Preferred Alternative provides significant delay reduction benefits at current and all future activity levels. See Chapter 4 of this Supplemental DEIS/FEIR
32.	Logan is 11th in operations, 17th in passengers, 18th in cargo. Is this why the delay--too many small planes?	There are a number of factors that cause delay, including wind, weather, fleet mix and demand. Please refer to Chapter 1 of this Supplemental DEIS/FEIR for a discussion of the specific causes of delay at Logan and the proposed improvements for addressing various sources of delay.
33.	With regional airports, high-speed rail, and videoconferences: "It is possible that Logan would not realize the 37.5M passenger level until some time beyond 2010. In fact, if Logan continues on its current growth path, it is likely to achieve close to 34M passengers in 2010." So, why does MPA continue to use 37.5M and 45M passenger levels as representing "reasonable long-term planning levels for use in evaluating the relative merits of alternative airside improvements at Logan"?	Please refer to Chapter 2 of the Supplemental DEIS/ FEIR for a discussion of the impact of regionalization on demand for Logan. This Chapter describes how the regional airports and high speed rail dampen the rate of growth for Logan, delaying until 2015 and 2024 when Logan is expected to reach 37.5 million and 45 million passengers, respectively. The 37.5M and 45M passenger forecasts still remain valid long-term planning projections for Logan. Furthermore, a projected 2010 passenger level of 34 million is bounded by the Airside Planning forecasts of 29M, 37.5M and 45M. Also, the delay analysis clearly demonstrates that the Preferred Alternative would have provided significant delay reduction benefits in 1998 if Runway 14/32 were in place (see Chapter 4).
34.	Pg. 6-20: The contours on 29M Low Fleet forecasts assume a "low level of commuter operations in the mix." But Logan has 45% of its fleet as commuters. How do you explain this?	The percentage of non-jet aircraft in the 29M Low Fleet, 41.8%, is very similar to current conditions at Logan. In 1999, non-jets accounted for 39% of all Logan aircraft operations.

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35.	How do you explain discrepancies they found in forecasts and assumptions discussed on pg. 6-30?	Chapter 6 of this Supplemental DEIS/FEIR explains differences between Logan's actual 1998 activity and fleet mix and the forecast 29M Low scenario. The differences do not imply that the 29M Low scenario is unrepresentative of a future scenario at Logan, nor does it imply that it is not instructive for analyzing proposed improvement projects.
36.	It is necessary to have a full air quality analysis on income and minority communities as a basis for projecting future impacts if 14/32 is built?	Refer to Chapter 6 of this Supplemental DEIS/FEIR for a detailed discussion of the Environmental Justice analysis. Low income and minority populations were defined in accordance with Federal Executive Order 12898, the Final U.S. Department of Transportation Order, and environmental justice guidelines from the Council on Environmental Quality. In addition, the analysis of low-income populations was expanded to include households at 150 percent of the poverty level. Even at this expanded poverty threshold the Preferred Alternative does not result in any high and adverse disproportionate impacts to low-income and minority populations.
37.	How do you justify 14/32 as an over-the-water runway when Figure 6.2, pg. 1-4 shows Runway 14/32 actual flight tracks over southwest Boston and south-shore communities after a short stretch of harbor? Flying over Quincy, Dorchester, Mattapan, Hull, Hingham, and Milton are not all over the water.	All jet aircraft departing from Runway 14 will follow noise abatement departure tracks and will be above 6,000 ft when passing over Hull and other South Shore communities. Aircraft on straight-in arrival tracks to the Runway 32 end fly over water longer before overflying communities than aircraft arriving to any other runway end, except Runway 33.
38.	There needs to be a section about land use and social impacts to the Fan Pier and South Boston waterfront development by increased use of Runway 27 if Runway 14/32 is built. 60-65DNL encompasses that area and the 65-70 DNL contour extends into Southie if 14/32 happens.	The 60-65 DNL contour for the Preferred Alternative for the 29M Low scenario, which produces the largest Airside contours, falls within the 1999 actual 60-65 DNL contour over South Boston. Therefore Runway 14/32 and any increased use of Runway 27 do not cause any additional land use or social impacts beyond those that exist today.
39.	How can it be stated (pg. 6-1) that "No one residing in the area exposed to noise above 65 DNL is projected to experience an increase in levels in excess of 1.5dB due to the preferred alternative"? On the same page it states that for 29M. The forecasts show 380 more people will be included in the new 65 DNL contour with the preferred alternative over the "no action" and in the 37.5M High forecast 508 more people will be in the 65 DNL contour (Figure 6.2-5, pg. 6-20, pg. 6-29.)	The reference to the bullet on page 6-1 of the Interim Supplemental Draft EIS ("Brown Book") that was distributed to the Panel refers to the 29M Low fleet. For the 29M Low fleet, the noise increase experienced by these populations as a result of the Preferred Alternative is less than 1.5 dB. This Supplemental DEIS/FEIR clarifies that this point refers to the 29M Low fleet.

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40.	Table 6.2-9 shows increased "newly included" populations impacted by an increase of 1.5 dB inside the 65-70 DNL contour. That equals 3,905. Explain this please.	See response to Question 39.
41.	There is no discussion of new terminal developments and how they will impact airspace capacity. Will there be new gates added? Will there be an increase of traffic? What are the impacts?	The delay and environmental impacts of current and future aircraft operations levels are fully reflected in the Airside Project. The 1999 ESPR discusses all landside projects, including terminals and ground access, and Massport's planning forecasts, which are consistent with the forecasts analyzed in the Airside Project.
42.	Pg. 3-1: What does the FAA plan to do about its agreement with the City of Boston not to reduce the minimums.	The FAA did not enter into an agreement with the City of Boston. The agreement between the FAA and Massport stipulates that any modification of the existing approach minimums requires completion of an EIS, even though the setting of minimums is otherwise categorically excluded from the EIS process. Incorporating the analysis of reducing the minimums honors the FAA's agreement with the Massport.
43.	As Green, Manchester, Portland, and Worcester mature, can't those passengers be better served with direct flights without coming to Logan?	Chapter 2 of this Supplemental DEIS/FEIR discusses in detail the passengers that the regional airports can be expected to "recapture" from Logan.
44.	Isn't San Francisco proposing a ban of aircraft smaller than 30 seats (to reduce airside congestion), working with United to use larger planes, and moving commuters to surrounding regional airports? Can't we do that too?	San Francisco withdrew this proposal. Logan serves as a gateway to the national and international air transportation systems for small, remote New England communities that do not generate enough demand to support direct flights to other destinations. Passengers traveling between these communities and Logan on commuter airlines rely on connecting services at Logan to reach their final destination. The regional airports are not a good substitute for Logan in this regard because they lack the demand to support the breadth of services available at Logan.
45.	What are the factors that lead to a "high" or "low" fleet scenario? How can we get a "very low" scenario?	The number of operations and size of aircraft are what separate the high and low fleets. For a forecast passenger level, a "High" scenario assumes a high proportion of small aircraft in the Logan fleet. By comparison, the "Low" scenario for the same passenger level assumes a smaller proportion of small aircraft and thus fewer operations. Through market forces Logan's current fleet is similar to a "Low" scenario. In fact, in 1999 and 2000, Logan's annual aircraft operations had declined due to reductions in regional carrier turboprop flights. If Logan should move towards a high fleet, the proposed Peak Period Pricing Monitoring System will identify that and the necessary action to deter delays due to the over scheduling of a high fleet.

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46.	What is the trade-off between reliability and number of aircraft movements per hour? What proportion of time can Logan handle 120 movements per hour? 100? 80? 60? 45?	Logan's highest capacity is 120 movements per hour. The objective of this Supplemental DEIS/FEIR is to maintain this capacity in all operating directions, thereby improving the reliability of the airport. Artificially constraining airport capacity is not a project goal.
47.	What is the private sector mechanism that regulates over-scheduling? Just what is the level that convinces airlines to increase the size of aircraft and reduce the frequency? How do European airports handle this issue? Other US airports? Why can't FAA and MPA aggressively work with the airlines to reduce over scheduling and increase the number of large planes used at Logan?	A mechanism for managing over-scheduling is Peak Period Pricing. The pricing necessary to convince an airline to increase aircraft size or reduce frequency varies with a number of factors including the mix of business and leisure passengers, the number of passengers, existing aircraft size, and the opportunity cost of doing something else with the aircraft. Some European airports have a form of Peak Period Pricing, while others have some form of hourly or daily caps. Massport is committed to implementing Peak Period Pricing if over-scheduling becomes a contributor to delay and has designed a monitoring system to detect over-scheduling.
48.	What are the possible actions to divert passengers from Logan?	The regionalization of aviation in New England is currently underway. As a result of capital investment, service expansion at regional airports and coordinated efforts between Massport and other Federal, state and local agencies, eight out of ten new passengers in New England have used regional airports since 1996. Refer to Chapter 2 of this Supplemental DEIS/ FEIR for a discussion of a new study effort by the New England Region of the FAA and Massport that will identify new efforts to further regionalization.
49.	What is the maximum number of passengers Logan can handle? Both of the above (47 and 48) must have thorough analysis.	The maximum number of passengers that Logan can handle is an indeterminate number. As a service facility, the key measure is the level of service (e.g. queue length and delays) that is experienced by aircraft, passengers and vehicles flowing through the airport complex. These depend on many factors that are constantly changing, such as weather, types of users, etc. Massport's Airside and Landside improvements are aimed at providing a higher level of service for all users, in an environmentally responsible manner.
50.	There is a need to analyze a reasonable fleet mix, which would get the % of the passengers using 15% or 20% of the airside capacity using small regional jets of 30, 50 or 70 passengers. How do we get a more reasonable fleet mix?	This Supplemental DEIS/FEIR analyzes a new fleet that includes a significant number of 30-70 seat regional jets and a small proportion of turbo-prop aircraft. See Chapters 4 and 6 for a discussion of the delays and environmental impacts associated with this new High RJ Fleet. Also see response to question 47.
51.	There should be an analysis of a low reasonable fleet with only 15% of the operations in small aircraft and regional jets and a high reasonable fleet of 22% in order to show the impact that a different fleet mix might have. Back to a previous question,	Refer to Question 50. The broad range of fleets analyzed in the Airside Project clearly indicates that as operation levels increase, delays also increase. The analysis shows the delay associated with Action and No Action for 14 different aircraft operations levels. These are: 1993 historic operations; 1998 actual operations;

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	this hopefully would show how reliable the different levels of movement are, e.g. 120 movements an hour; 110, 100, 90, 80 or 70 per hour. We could see what delay happens at what movement rate.	Alternatives 1A and 4 for 29M Low, 29 High, 37M Low, 37M High, 37M RJ, and 45M High; and Alternatives 1, 2 and 3 for 29M Low, 29M High, 37M Low, 37M High, 37M RJ and 45M High. Note that alternatives with Peak Period Pricing (Alts. 1,2,3) result in a lower number of operations than alternatives without Peak Period Pricing (1A and 4) due to scheduled flight cancellations.
52.	There needs to be a different set of figures to be developed as an alternative to the one the MPA uses to illustrate "High Fleet" and "Low Fleet." Their "High" is unreasonable. Their low is still excessive. There has to be a description of the relationship of schedule and fleet mix to reliability. The MPA definition of over-scheduling is too high. Information about how the runways are used and how it affects delay would be more helpful. The definition of over-scheduling could then be relaxed to real information.	Please refer to responses to Questions 50 and 51. The Massport forecasts represent reasonable near and long-term projections of passenger growth and are consistent with the FAA's Terminal Area Forecasts. The future "High" and "Low" fleet scenarios are based on real information regarding the aircraft orders and options of airlines, and assumptions, based on historic and current conditions, of how many regional airlines will operate at Logan. This approach has produced a broad range of future aircraft operation levels for accommodating the projected levels of Logan passenger demand. The future scenarios assume that the rate of increase in aircraft operations is lower than the rate of passenger growth. This is consistent with recent trends and assumes that passenger load factors increase over time. The long-term fleet scenarios assume operations increase by 0.8% to 1.6% average annual growth over Logan's CY 2000 operations. These forecast growth rates are significantly lower than Logan's historic long-term operations growth, which is 2.4% average annual growth between 1980 and 2000. The threshold used to define overscheduling was 110 operations per hour, which is below Logan's normal operating capacity and is reasonable. For information on how the runways are used and how delays at Logan accrue, refer to Chapter 1 of this Supplemental DEIS/FEIR.
53.	The MPA approach analyzes two alternatives, with and without a new runway, using their definition of "high" and "low" fleets. Both show delay returning and exceeding present delay with or without the runway. We need to have different analysis to show how regionalization would answer this issue in a better way using different descriptions of "high" and "low" as described in a previous question as "reasonable" high or low.	Please refer to responses to Questions 26, 27, 33, 50,51, and 54.

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54.	If the goal is to achieve a more reliable regional transportation system, the analysis is not "clear weather" or "low wind" but all delay. If the reasonable high/low alternatives with and without an added runway are analyzed, the effectiveness of a new runway could change. The runway would have fewer numbers of planes and the issue of regional jets not willing to use a 5000' runway (as in Atlanta and Philadelphia) would be a part of the study. This analysis is necessary.	The Airside Project analyzes the runway's benefit at 14 aircraft operation levels, including the level achieved in 1998. Regardless of the demand level, the runway provides significant delay reduction because it fixes an inadequate runway system—the lack of a third runway in northwest wind conditions (See Chapter 1 of this Supplemental DEIS/FEIR). By serving the largest concentration of population in New England, Logan Airport plays a critical role in the region's air transportation network. The purpose of the Airside Improvements Project is to reduce delays at Logan that can be alleviated by improving the efficiency and reliability of the airfield. These include delays due to northwest winds, and, when it is a problem, delays caused by airline overscheduling. Reducing these sources of delay at Logan improves Logan's reliability and improves the region's airport system (See Chapter 2 of this Supplemental DEIS/FEIR). The FAA conducted a review of the utility of a 5,000-ft runway at Logan and concluded that the proposed runway could accommodate all turboprops and most of the regional jet types expected to use Logan Airport (See Appendix C of this Supplemental DEIS/FEIR.)
55.	Analysis should be done to show how a new "reasonable" fleet mix would affect total delay and how presumably it would cause a significant reduction in total noise exposure. When there are delays planes are put off to the extent that more fly at night where the noise is louder.	It is correct that delays often push aircraft into the night when aircraft noise is more annoying to people in surrounding communities. By reducing delays that occur during northwest winds, the proposed runway will keep daytime flights from being delayed into the night during these operating conditions. A new fleet using a higher proportion of regional jets, the 37.5M High RJ fleet, was analyzed in the Supplemental DEIS/ FEIR. See Chapter 4 for the operational impacts of the new High RJ fleet and Chapter 6 for the environmental impacts of the new fleet.
56.	If the number of 19-seat aircraft is reduced (which would be necessary if Logan accommodates more passengers), the effectiveness of both 14/32 and the centerfield taxiway changes. This needs to be analyzed.	A comparison of the delay reduction results for the High and the Low fleets, shows that the proposed runway is effective even with the lower numbers of 19-seat aircraft operations in the Low fleet scenarios. The FAA's review of the length of the 5,000-ft runway concludes that the proposed runway would be able to accommodate regional jets. (See Appendix C of this Supplemental DEIS/FEIR.) Further, the analysis of the new 37.5M High RJ fleet, which reflects the FAA's RJ utilization assumptions, indicates that the runway is effective even if airlines reduce the number of 19-seat aircraft and replace them with larger, 30- to 50-seat regional jets. (See Chapter 4 of this Supplemental DEIS/FEIR.) The Centerfield Taxiway will serve all types of aircraft

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		operating at Logan, to reduce taxiing delays and thereby environmental impacts.
57.	Again to the centerfield taxiway–how much delay would exist if Logan had 100 movements per hour? There should be some analysis of the sensitivity of delay to the number of operations, and the relationship of the number of operations to aircraft size.	The Airside Project examined a broad range of impacts associated with 14 different levels of aircraft operations, including two historic levels (1993 and 1998). The objective of the analysis was to determine operational/delay benefits and associated environmental effects for the spectrum of likely future demand conditions at Logan. Demand levels associated with artificial caps on hourly operation levels that are well below the airport's VFR capacity were not examined. The centerfield taxiway provides safety and efficiency benefits at all operation levels. The analysis of taxiway delays in the Draft EIS/EIR shows that the centerfield taxiway and the other taxiway improvements provide 15,000 to 22,000 hours of taxiway delay across the range of future operations forecasts.
58.	The safety risks of the centerfield taxiway need to be considered. The taxiway could be mistaken for a runway and the turns could be potential hazards. These issues need analysis.	Practically all major airports with parallel runways, like Runways 4 and 22 at Logan Airport, also have parallel taxiways. Runway markings, air traffic control procedures, and electronic approach guidance during poor visibility make mistaking a runway for a taxiway highly improbable. The Centerfield Taxiway will satisfy all applicable FAA safety regulations regarding its design, construction, lighting, marking, signage, and use.
59.	The queue issue needs to be evaluated as well. If a change in management pushback happened, only a limited number of aircraft could be in a line at one time. There has been a question about queue before as it applies to existing conditions and how this would relate to a new taxiway.	The Centerfield Taxiway is intended to reduce queues and taxiway delays. It will prevent aircraft queues in the northern sector of the airfield waiting to cross runway 4L/22R, and will reduce delays on Taxiway November by allowing aircraft that require Runway 22L for takeoff to bypass the queue for 22R. It will also provide an alternate taxipath when pushbacks interfere with operations on Taxiways Alpha & Kilo.
58.	Holding peak pricing in abeyance until over-scheduling occurs needs to be reevaluated. This would allow a counter-productive pattern to occur and grow before it is addressed by starting peak pricing. There needs to be an evaluation of the over-scheduling today and how peak price would address it and include exemptions and/or discounts for airlines who need it or just adjust their schedules.	The Airside Project has performed a comprehensive analysis of Peak Period Pricing. The analysis presented in Chapter 4 of this Supplemental DEIS/FEIR addresses the issues raised in this comment. To deter over-scheduling without a pre-emptive Peak Period Pricing Program, Massport has designed a schedule monitoring program which is also described in Chapter 4 of this Supplemental DEIS/FEIR .
59.	In a recent article, two Virginia Tech engineers working under the auspices of the FAA devised a new approach in which air traffic controllers could alleviate time delays in a big way. With the involvement of U. of VA, U. of CA, U. of MD, and MIT, they	Comment noted. There are many excellent and interesting delay related studies and analyses underway. Massport's delay reduction program addresses specific delays at Logan that are caused by the lack of a third available runway in northwest winds. This source of delay at Logan cannot be remedied by a national

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	developed aviation related computer models to improve airport capacity and reduce delays. Their paper, "Integration of Simulator Models to Evaluate the National Airspace System", describes the bottleneck in the air traffic control system and how to solve it. They developed 3-computer software models that help controllers sequence arrivals and departures in a better way, which reduce time connected with taxiway operations. Please present this approach and how it would address the delay issues.	program focused on the Airspace System. Therefore discussion of the referenced analysis would not be germane to Logan Airside Program. This specific comment was addressed by the FAA during the August 22, 2000 SDEIS Panel meeting. Please refer to the SDEIS Panel meeting minutes in Appendix A of this Supplemental DEIS/FEIR.
60.	Writing in the N.Y. Times on August 13th, Joe Sharkey used a quote from Dante to describe the air traffic gridlock: "Abandon hope all ye who enter here." There were 44,401 delays in July 2000, about the same as July 1999. But July 1998 had 25,672. And these don't count cancelled flights. The thesis of the article is that airlines enjoy record revenues now with fuller planes and have no incentive to do more than pay lip service to complaints. And Congress, under pressure from industry lobbying, didn't act to resolve the issue. Please discuss ways to address this gridlock and over scheduling by airlines.	Massport's Airside Delay Reduction Program is designed to alleviate delays that are specific to Logan, causing Logan passengers to suffer unnecessarily. It does so by offering a full complement of remedies designed to reduce delays associated with an inefficient taxiway system, artificially high landing minimums, northwest winds and over-scheduling.
61.	An air traffic controller from Foster City, CA, recently wrote that "trying to cram more planes into a specific Airspace won't solve delays, it will make them worse." He says bigger planes, especially the huge new aircraft, will make it even worse. He also blames the industry for basing their scheduling on profit motives. He says building more runways at SFO, OAK and SJC will not manufacture more airspace. Please explain this issue and show how it relates to the issue at Logan.	The Logan Airside improvements are not intended to solve the nation's delay problem. Likewise, national delay reduction measures that improve airspace flow will not have any impact on delays specific to Logan, such as northwest wind delays. Massport is proposing improvements at Logan that will alleviate delays caused by inefficiencies in the airport's runway and taxiway system, and by overscheduling if this becomes a problem. The Airside analysis presented in Chapter 4 of the Draft EIS/EIR and Chapter 4 of this Supplemental DEIS/FEIR demonstrates that the proposed runway will virtually eliminate VFR delays that occur because the airport lacks a third available runway in northwest wind conditions.
62.	Since delay is a "given" at all major airports. How much delay is "acceptable" to the MPA?	There are certain delays that Massport can not solve (i.e., aircraft mechanical problems, snow storms, etc.) or are outside Massport's purview (i.e., delays at other airports, airspace delays, etc.). Massport supports efforts to solve these delays but is forced by circumstances to accept them. The delays that are "unacceptable" to Massport are delays that Massport can do something about, such as delays caused by Northwest Winds, airline over-

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		scheduling, an inefficient taxiway system, and artificially high approach minimums. The Airside Delay Reduction Program is designed to alleviate these delays in an environmentally beneficial manner. See Chapter 4 and Appendix C of this Supplemental DEIS/FEIR for the amount of delays at Logan that Massport can eliminate with Airside improvements.
63.	How much delay reduction does 14/32 give in non-NW wind conditions and describe how it would work?	Even without northwest winds, unidirectional 14/32 does provide modest delay reduction benefits. In certain other wind conditions, Runway 14/32 can provide a more efficient configuration than those otherwise available. As shown in Figure 4.6-1 of the Supplemental DEIS/FEIR for 1998, Runway 14/32 would have reduced northwest wind VFR delays by 31,200 hours (87%) from 35,900 hours to 4,700; for the other directions combined, it would have reduced VFR delays by 4,600 hours from 16,200 to 11,600 hours.
64.	Can the FAA produce written confirmation to the panel that all airlines flying regional jets will use 14/32 for arrivals and departures?	The FAA does not control decisions made by individual pilots on whether or not to accept a runway. Every landing is unique, in terms of wind, weather, temperature, aircraft loading, pilot experience, and other factors. A study done by the FAA following the SDEIS Panel process suggests that the majority of regional jets will utilize Runway 14/32. See Appendix C of this Supplemental DEIS/FEIR.
65.	From the impacted communities on the South Shore is this concern: They project that the extended axis of 14/32 would intersect with the axis of 15/33. Please detail any plan to manage this conflict. Where will the traffic be routed? Until this is done, one cannot determine the environmental impacts, other than by conjecture	Runway 14/32 is oriented at an angle of 8.5 degrees toward Runway 15R/33L, so the extended centerlines intersect about 5 nm from the runway thresholds. Aircraft approaches to Runway 32 will be conducted along a path parallel to Runway 33L until the aircraft is about ¾ nm from the threshold, where the pilot would make a slight left turn to line up with the runway centerline. Thus the two final approach courses are parallel and separated by about 4,000 feet.
66.	Please evaluate an alternative VFR approach to 33L. It would involve placing a glide slope beacon on Thompson Island, the arrivals coming in over the harbor mouth then guided by the new beacon, making a right turn into the final approach to 33. This would be a true "over the water" approach.	Such a procedure is theoretically possible, and could be better developed using Long Island, or without any additional navaids for aircraft equipped with RNAV (e.g. GPS) and FMS (Flight Management Systems). However, it would involve a sharp right turn (about 45 degrees) at a low altitude approximately two miles from Runway 33L.This would be a very unsettling and unsafe maneuver for large passenger jets, and would be disapproved by the FAA and refused by airline pilots. Commercial turbojets require a stabilized straight approach during the final 5 miles for normal operations.
67.	Please provide and explain all the runway combinations that would be used if 14/32 is put in place. Along with this please show a traffic management plan showing what pilots and controllers will do for approaches,	The runway combinations using Runway 14/32 are presented in Appendix H of the Draft EIS/EIR. The flight tracks for arrivals to and departures from Runway 14/32 are shown in Chapter 5 of the Supplemental DEIS. Most Runway 32 approaches would be conducted in

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	missed approaches and departures out to at least 15 DME for each runway combination.	VFR conditions, but simultaneous dependent approaches to 32 and 33L are anticipated. The FAA will have to develop the missed approach procedure for Runway 32, but it will likely be a turn to the south similar to that for Runway 22L. The missed approach point would be over the harbor at an altitude of 400 feet or higher.
68.	Please present a Community (sic) in 1999 (2000 would be better!) and in 2010 for each planning alternative. These should be presented both graphically and in the form of statistical tables. Arrivals and departures should be detailed separately. All affected towns within Rt. 128 should (sic) as well as S. Shore towns down to Scituate and Norwell. If towns are affected differently in their different parts, with one getting departures for instance, the parts should be broken out separately on the tables, which compare alternative future scenarios.	Appendix E of the Airside Project Draft EIS/EIR included detailed operations data by runway end for each fleet and each alternative. Data was listed separately for arrivals and departures, and separately for jet aircraft and non-jet aircraft. Appendix C of this Supplemental DEIS/FEIR contains the same detailed operations data for the new 2015 High RJ fleet.
69.	Please show data which would have approaches and departures in "over the water" designs and have planes no closer than 1.25 miles to mainland areas out to a distance of 10 DME. If claims are made that fewer people will be affected by noise, such claims should be specific and quantified.	Please see the response to question 58. Chapter 6 of the SDEIS presents noise-exposed population details by town or neighborhood for the 29M Low, 37.5M High and 37.5M High Regional Jet Fleets.
70.	Please show data that clearly demonstrates what factors have correlated with increases in operations efficiency (more passengers per op.) at other airports in the past. With this data, present Logan in relation to whatever key indicators are found and then revise the operations forecasts to reflect the new understanding.	See Chapter 3 of this Supplemental DEIS/FEIR for a discussion of demand management programs at other US and international airports.
71.	Request that the EIS and ROD include language that makes a commitment not to fan out departures from any runway as a means of increasing capacity. Commit to not reduce departure intervals below those now in use.	The Logan Airside Improvements do not propose any changes to existing ATC procedures or flight tracks other than Reduced Minimums and Unidirectional Runway 14/32.

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72.	The EIS should contain a side-by-side comparison of actual measured noise data and modeled data for each MPA noise monitoring station for each planning alternative. If under estimation of modeled vs. actual measured, we request a new noise modeling study which increases operational parameters until they show only non-systemic variation from measured data. Contours resulting from new data should be compared to previous contours.	It is not possible to have actual measured noise data for future scenarios and planning alternatives. However, Chapter 6 of this Supplemental DEIS/FEIR does contain data and a discussion of measured versus modeled noise for 1999 Logan operations. Massport has reported differences between measured and modeled sound levels in Logan Airport's various GEIRs and Annual Updates (now called the ESPR) for a number of years. Differences at close-in locations were significantly reduced in 1996 through modification of source levels to better account for over-water sound propagation and apparent use of higher engine power settings than are normally assumed in the noise model's database (Refer to Appendix F of the *Logan Airport 1996 Annual Update).* In 1998, differences between measured and modeled noise became even less when Massport upgraded its monitoring system and began to report noise caused only by aircraft -- a metric directly comparable to the DNL exposure levels predicted by the noise model. At sites having exposure levels of 60 dB or more, this improvement to the monitoring system brought measured and modeled DNL values to within 0.2 dB of each other (Refer to Chapter 5 of the *Logan Airport 1998 Annual Update*). Massport continues to investigate possible causes for remaining differences and continues to pursue FAA approval of noise model adjustments that would permit expansion of its sound insulation program to include the effects of terrain. Massport also expects to extend eligibility lines to include boundaries that follow local streets rather than strict noise contour lines. Nevertheless, Massport continues to believe that the FAA's INM noise model used in the Airside Project noise analyses accurately represents expected noise exposure.

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73.	The EIS should contain a map showing all sub-paths used to do noise modeling for jets for each arrival and departure. The map should show these paths in relation to geographic and political boundaries. Explain methods of selecting sub-paths and how they are validated. There should be a complete listing of modeled aircraft for each planning alternative and how choices were made. There should be also an explanation of what tests were used to validate the assumption that in noise modeling noise from over the water approaches should be boosted for operations below 1,000 feet but not for those over water at higher altitudes.	The darker lines in Figures 5.2-1 and 5.2-2 indicate the actual flight tracks used to model the operations for all scenarios involving the existing runway configuration. The darker lines in Figures 6.2-1 through 6.2-4 indicate the actual modeled tracks used to model all scenarios, which include the proposed new unidirectional Runway 14/32. In each case, tracks flown by jets are shown in yellow, turboprops are shown in purple. Arrivals are separated from departures. Political jurisdictions for all communities within approximately 20 miles of Logan Airport are outlined on the basemaps in these figures. The lists of aircraft modeled on these tracks and their frequency of occurrence are included in multiple tables in various appendices to the study documents. The aircraft types modeled for 1993 and for all the original 29M, 37.5M, and 45M High and Low scenarios were shown in Volume III, Appendix E, Table 11 of the Draft EIR/EIS (the "Blue Book"). The table lists annual operations by individual aircraft type; the noise model used these numbers of operations divided by 365 to get average daily operations. The frequency of occurrence for all of these flights were shown in Appendix H of the same document in the table labeled "Aircraft Operations by Fleet, Alternative, Runway End and Operation [arrival or departure]." The aircraft types modeled for all of the 1998 and 2015 High Regional Jet Scenarios are shown in Volume Two, Appendix C. In these cases, the operations are shown as average daily operations. Their frequency of occurrence by runway end is also shown Appendix C. Justification for the over-water sound propagation adjustments are included in a letter from Mr. Kenneth Eldred to Mr. John Gulding at the FAA's Office of Environment and Energy requesting approval to modify the INM database so as to improve the differences between measured and modeled noise exposure levels. The letter along with FAA's response is included in its entirety in Appendix C of the Interim Supplemental DEIS (the "Brown Book"). The changes are applicable to aircraft at low altitudes because over-water sound propagation differs from normal over-ground sound propagation only when an aircraft is low to the horizon and the noise emanating from it reflects off the acoustically "hard" surface of the water as opposed to being partially attenuated (lessened) as it passes over softer ground.
74.	Explain the geographic scope of the EIS. How was the study area determined? Was noise modeling used to determine it? If so, there should be a discussion of alternative	Chapter 5 of the Airside Project Draft EIS/EIR and this Supplemental DEIS/FEIR discuss in detail the geographic scope of the Logan Airside project. As described, the study area for each category of impact

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	methods for determining the study area not based on noise modeling.	varies. For example, noise impacts are examined in a number of ways including Day Night Sound Level (DNL) contours beginning with areas closest to the airport, the 75DNL out to the FAA's threshold of incompatibility at the 65DNL. In addition to this, and in response to the May 7, 1999 EOEA Certificate, Massport presented analysis out to the 60 DNL contour. Please refer to Chapter 5 for definition of the various study areas.
75.	Request that an appendix to the Brown Book, in which all tables, slides, and other graphics shown to the Garvey Panel, but not included in Brown Book, be published and distributed to the public.	Comment Noted. Please refer to Appendix A of this Supplemental DEIS/FEIR , which contains meeting minutes for all the SDEIS Panel meetings. These meeting minutes reflect the substance of all presentations made to the Panel as well as questions and answers that followed each presentation.
76.	Request that a study of steeper approach paths as a method of mitigating arrival impacts be done. It should include other airports in the US and abroad using such steeper paths.	Comment noted. The FAA requires that all new or relocated glideslopes be commissioned with the standard 3 degree slope. Steeper approaches can only be approved by Washington under exceptional circumstances. Foreign practices are not applicable in the US.
77.	The EIS should include an evaluation of the Airport Noise & Capacity Act of 1990, including a discussion from a qualified attorney about what altérnatives will be available to future MPA management teams if they wish to modify or undo effects produced by the construction of 14/32, or if they wish to remove 14/32 from service.	Comment noted. Evaluation of the Airport Noise & Capacity Act is not part of this Supplemental DEIS/FEIR.
78.	The EIS should include a study identifying communities affected by jet operations from more than one runway.	The Draft EIS/EIR contains analysis of all communities within the 65 DNL, the FAA's threshold of incompatibility. In fact, at MEPA's request, the analysis extends to the 60 DNL. These contours contain all communities affected by one or more runways.
79.	Compare the experience they can expect with 14/32 in operation to the PRAS goals established for communities near the airport.	Refer to Chapters 4 and 6 of the Airside Project Draft EIS/EIR and this Supplemental DEIS/FEIR for a comparison of PRAS achievement for the Preferred Alternative and the No Action alternative.
80.	Request that a study be done to show, in NW winds, what other delays (en route, over-scheduling, and mechanical problems) are happening at that time? What is the %? This should be in the EIS.	Comment noted. Appendix D of this Supplemental DEIS/FEIR contains a case study of northwest wind delays. There are no data on all of the other delays that may randomly take place in northwest conditions. However, all of the delays identified in the Draft EIS/EIR as occurring in northwest winds are due to northwest winds, and not to other causes.
81.	Recommend that the "first come, first served process" be studied with respect to the possibility of changing it as a demand management technique	Discussions with the FAA Headquarters in Washington determined that this concept would require study on a national basis.

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82.	Since delay is a given at all airports, the CAC asks the FAA to determine, within the SDEIS process, "acceptable" delay at Logan.	See response to question 62.
83.	The CAC, through the Panel, requests that the FAA quantify and qualitatively present the complete, cumulative environmental impacts, as well as the total cumulative construction environmental impacts of the following: the proposed Runway 14/32, the proposed centerfield taxiway, the forecasted increase of ground transportation to and from Logan within a four mile radius of Logan, and the Central Artery project.	Chapter 7 of this Supplemental DEIS/FEIR discusses the cumulative environmental and construction impacts of the Preferred Alternative, which includes Runway 14/32 and all the proposed taxiway improvements, and all concurrent construction projects. The impacts of ground transportation traffic associated with each forecast passenger level are discussed in the *Logan Airport 1996, 1997, and 1998 Annual Updates*, and the *Logan Airport 1999 Environmental Status and Planning Report.*
84.	The CAC requests that the FAA rule that the impact of the proposed dramatic increase in air traffic that would be generated by Runway 14/32 over densely populated inner city, low income and minority communities is too significant to warrant FAA approval to construct this new runway.	Comment noted. Please refer to Question 36 for environmental justice.
85.	The CAC requests that the FAA engage "outside the box" professional transportation planners to bring alternative proposals to Runway 14/32 to the Panel table for consideration.	Comment noted.
86.	Has the direction of 14/32 changed? If so, how did it change and why?	The direction has not changed.
87.	Request from the Town of Hull Jet Noise Task Force that the FAA/MPA do a Part 161 study to obtain all the additional data it would produce.	Comment noted. A Part 161 analysis is not part of the scope for this Supplemental DEIS/FEIR.
88.	Request from the Bayswater neighborhood in East Boston that Panel support in the study of a higher blast fence and make it collapsible as well.	In December 2000, Massport filed an ENF to remove the blast fence because of aircraft safety concerns. Massport's analysis showed that the benefits of the blast fence to the Bayswater community are very minimal and better results could be achieved through mitigation. Massport provided funds to the Bayswater Blast Fence Committee (BFC) to hire an independent consultant to study Massport's proposal.
89.	The prediction of a threefold increase in flights departing Runway 27 brings a request from the Roslindale/Jamaica Plain neighborhoods that a noise monitor be placed in their area to record present noise impacts. They also request that an analysis of the readings from this microphone be analyzed and compared to the predictions for this runway if 14/32 is built. In addition this neighborhood wants to know how the information from this microphone would be	Massport will consider adding a permanent noise monitor in the vicinity of Jamaica Plain. If it is added, the data collected by the monitor will include metrics such as the annual average DNL represented by the noise contours of this study. However, as is the case with all of the permanent measurement sites, the measured levels are not incorporated directly into the INM; rather, the results are compared to modeled levels to check for potential inconsistencies and to improve INM inputs when it is determined that the measurements highlight a problem with the noise modeling. In the past, such

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	incorporated into the INM and what the difference, if any, in the description of the neighborhood noise would be.	inconsistencies have led Massport to modify its noise model to account for over-water sound propagation and, more recently, to include the effects of terrain in Orient Heights.
90.	From the City of Cambridge comes the request to research the implications of the statement: "Increase the aircraft size, decrease the frequency."	Comment noted. All of the forecasts used in the Draft EIS/EIR reflect an increase in average aircraft size over time.
91.	In Charlestown a question about the reliability of the predictions that 37-45 million passengers would be handled at Logan in the future. How reliable is this information? On what do you base this information?	To accommodate uncertainty, a wide range of future passenger and activity forecasts have been studied in the Logan Airside Project. This includes Logan's actual activity levels achieved in of 1993 and 1998, as well as 12 different levels in the future (with and without Peak Period Pricing). The forecasts are discussed in Chapter 4 of this Supplemental DEIS/FEIR and in Appendix E of the Airside Project Draft EIS/EIR. The uncertainty is not so much the future level of passengers, but when that volume will occur.
92.	From Braintree comes a request that the PRAS system be reevaluated before the expansion proposal proceeds. The feeling is that the PRAS has not achieved the goals all these years. The feeling is that the FAA didn't use the PRAS system whenever possible all these years. So, on what basis is the public in impacted communities to believe that the PRAS system will ever be used in future?	The proposed Unidirectional Runway 14/32 provides controllers with the ability to redirect more aircraft over water and away from people. Regardless of the noise policy, arrivals and departures over water would be desired. Runway 14/32 provides the tower with the ability to better achieve the PRAS goals by providing a third runway in the NW direction. If the tower can maintain capacity in all directions, they will be more likely to change runway configurations more frequently, which is the very foundation of PRAS. Section 4.3 of the Supplemental DEIS contains a detailed discussion of PRAS development and improvements, and of the FAA's increased conformance with the PRAS goals.
93.	A question on the INM input from the Town of Hingham: How is the data put into the INM and how is it verified? The question comes because there are noted differences between the on-site microphones and the Integrated Noise Model read-outs in Hull, East Boston, and Chelsea. Please research and respond to this in the DEIS.	The INM essentially utilizes flight tracks and the aircraft operations on them to compute noise at points on the ground. Existing flight tracks are generated directly from plots of radar data obtained from the FAA's air traffic control tower that are compiled by Massport's permanent noise and operations monitoring system. The specific aircraft types and the frequency with which they occur on the tracks are also determined from radar records generated by the monitoring system. Details of this data collection effort are summarized each year in Massport's *Environmental Planning and Status Report* (formerly known as a *Generic Environmental Impact Report*) for Logan Airport. Those annual documents have also addressed differences between measured and modeled DNL levels at the measurement sites around the airport. Though differences should always be expected to occur to some degree (due to factors such as pilot technique in flying

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		an aircraft, or non-standard atmospheric conditions), significant improvement in the differences between measured and modeled noise exposure was achieved when Massport upgraded its system in 1997 to report aircraft-only DNL as opposed to total DNL which includes the additional effects of non-aircraft noise. For example, in 1998 the difference between measured and modeled DNL due to aircraft was only 1.1 dB at site 26 in Hull, was 2.2 dB at site 15 in Chelsea, and ranged from -0.3 to 1.3 dB to 2.9 dB at the Jeffries Point Yacht Club, East Boston High School, and Bayswater Street at Annavoy in East Boston.
94.	In Chelsea there is an observation and a request. They believe that the "flaws" in the noise monitoring system are not researched and resolved in an adequate fashion in the document. But on issues of delays there are loads of statistics and analysis. They therefore believe that there are huge gaps on existing documents. And there will be unfair and inexact conclusions if the analysis information gap continues into the new document. Please address and resolve these gaps.	See responses to question 72 and 93.
95.	From Chelsea again a response to this statement is sought: "All growth must be accommodated." Please address this philosophy.	This comment is not attributable to the Airside Improvements Project or any Airside environmental documents. The Preferred Alternative provides delay reduction benefits at current operation levels and does not add capacity to the airport. Runway 14/32, which is part of the preferred alternative, allows Logan to maintain a 3-runway configuration in Northwest winds. See the analysis in Chapter 4 of this Supplemental DEIS/FEIR that quantifies 1998 delays at Logan and the delay reduction that would have been achieved if Runway 14/32 was available in 1998.
96.	In the City of Everett, the Council and several citizens requested an additional noise monitor to establish present noise impacts. So far this request has not been granted by the MPA. Their concern to the Garvey Panel is that present noise is being underrepresented from a threefold increase from Runway 33 departures and will be under-counted as well. Please analyze and respond to this issue.	A noise monitor is located in Everett on Tremont and Prescott Street that provides adequate noise monitoring data.
97.	People in Revere and the Orient Heights neighborhood of East Boston, and in Winthrop as well, want a presentation on the impacts of the Centerfield Taxiway and the changes on the landing minimums. They are	Revere, East Boston, and Winthrop all have representatives on the CAC. The CAC has been fully briefed on all aspects of the Airside Project. In addition, two public hearings on the Draft EIS/EIR were held, as well as meetings in each community to review the

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	very concerned that the true impacts of these proposals are not being disclosed and fully evaluated from a neighborhood perspective. Please respond. Please respond by having a meeting in the affected neighborhood.	project.
98.	The Somerville Airport Expansion Group asks that at the October meeting a presentation be made about the design of the runway surface and runway safety areas at each end of the proposed Runway 14/32. They want to know about displaced thresholds and landing distance available. They want to know what the glide slope and minimums will be. They want to know at what point missed approaches abort 14/32 landings.	Runway 14/32 has a landing distance of 5,000 feet with a Runway Safety Area of 1,000 feet on either end, and no displaced threshold. The FAA requires that all new glideslopes be set to 3 degrees. The IFR decision height is anticipated to be 400 feet, with a visibility minimum of ¾ mile.
99.	Why does the SDEIS show a waiver of FAA standards on safety on the proposed 14/32? The Cohasset Airport Study Silence (sic) believes that the FAA safety standards will be waived by the cutting off a corner of the runway safety area on the 14 end. How can they allow this when safety standards are FAA's stated top priority? Why not shorten the runway safety area? Should an accident happen within that officially truncated safety area wouldn't the FAA be responsible?	Chapter 3 of the Supplemental DEIS describes the proposed layout of Runway 14/32 and the associated Runway Safety Areas. The RSA on the approach end of Runway 32 will be a full 1,000 feet in length, but will have the corners trimmed slightly to avoid filling the harbor. A preliminary analysis by the FAA confirms that the RSA will provide an acceptable level of safety.
100.	From South Boston comes the request that the FAA include in the SDEIS the impacts the building heights planned for South Boston waterfront projects would have on Runway 27 departure usage. How would that negate any delay reduction benefits of Runway 14/32?	No known development plans in South Boston will require an increased climb gradient for Runway 27 departures. Any new development plans will be subject to a FAR Part 77 airspace evaluation by the FAA, which will not approve any additional restrictions on Logan operations. Nearly all aircraft operating at Logan exceed the current Runway 27 climb gradient by a wide margin. Moreover, this restriction applies only under IFR conditions, and Runway 27 and 32 will only be used together under VFR conditions.
101.	Does the INM take into account low frequency noise impact?	The A-weighted sound levels utilized by the INM include noise within the frequency range normally considered low frequency (25 to 80 Hz) but those frequencies are de-emphasized by the A-weighting because our ears are less sensitive to acoustic energy in those bands; there has been no special treatment of low-frequency noise metrics in these analyses.
102.	Does the INM depict the noise, which occurs directly behind the aircraft?	Yes.
103.	Does the INM take into account bad weather conditions that cause noise impacts to be worse than on a standard day? Do any weather conditions get reflected in the INM?	No. The INM only addresses average local temperature and airfield elevation to the extent that those parameters affect sound propagation. The model has no provision for accommodating bad weather days, strong winds,

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		temperature inversions, or similar non-standard conditions.
104.	Does the INM measure sideline noise as the aircraft rolls down the runway?	Yes.
105.	Has there been an in-depth federal study to show how noise impacts affect the health of people who live near airports? If so, where and what are the results?	No, although there have been Federally sponsored reviews of literature on the health effects of noise and a number of international conferences on the subject. To date, there has been no conclusive evidence from this body of work to indicate a link between noise exposure levels in the community and related health effects. Nevertheless, to the extent that high exposure levels have any detrimental effects on people, the Preferred Alternative does more to reduce these high levels than any other alternative considered in this analysis.
106.	Has there been a study that reflects how an airport affects a neighborhood's overall quality of life? Little things like talking on the phone, watching television or just trying to hold a conversation can at times be very difficult when you live close to an airport.	Yes. Among the earliest of such studies is the EPA's report on "Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety". The report addresses factors such as speech and sleep interference and considers public welfare to include such issues pertaining to quality of life. That document identified a DNL level of 60 dB as requisite to protect public health and welfare and a DNL level of 55 dB to include the margin of safety. However, the document was also careful to point out that EPA was not identifying a standard nor was it taking into account the technological or economic feasibility of achieving the identified levels.
107.	Although the document says there won't be any noise increase over the Boston Harbor Islands with the possibility of simultaneous arrivals on 33 and 32, how is this possible?	Section 6.3.3 of the Interim Supplemental DEIS was incorrect in stating that there are no increases in exposure over the Boston Harbor Islands under the Preferred Alternative. There are small increases estimated to be on the order of 1 to 3 dB depending on location within the Harbor. This Supplemental DEIS/FEIR is corrected to reflect this observation.
108.	The document includes less sleep disturbance in the preferred alternative. How can that be if triple the amount of operations fly off of 27 and triple the current amount of departures off of 33?	The Preferred Alternative causes an overall reduction in noise exposure by reducing aircraft delays and the number of daytime flights that are delayed into the night. In calculating total noise exposure nighttime jet operations (occurring between 10:00 PM and 7:00 AM) have a 10 times penalty to reflect the fact that nighttime noise is more disruptive.
109.	"Over the water" is a term most disputed in the South Shore. Their interpretation of the printed flight tracks combined with their experiential knowledge of observing the flight tracks has them conclude that planes are not flying "over the water" and will not fly "over the water" in the future. Please respond.	Aircraft on straight-in arrival tracks to the Runway 32 and 33 ends fly over water longer before overflying communities in the South Shore than aircraft arriving to any other runway end. Please refer to the Flight Tracks presented in Chapter 6 of this Supplemental DEIS/FEIR. The tracks have been expanded to cover a broader geographic area and include altitudes.
110.	There needs to be an environmental review	The PRAS goals were established by the PRAS

#	Comment	Response
	done on the PRAS so that all new information is shared with the public.	Advisory Committee, which consisted of representatives from Massport, the FAA, the airlines, and 12 neighboring communities. Massport's Preferred Alternative (Alternative 1A) mitigation program includes additional PRAS reporting requirements recommended to enhance the monitoring efforts. (See Chapter 4 of this Supplemental DEIS/FEIR.)
111.	It is necessary to have presented in terms lay people might understand the theory that the noise impacts generated by a threefold increase in departures on 27 and 33 are not significant or are even less than present use. Describe the reasoning behind the theory and how it is computed in recording the noise and drawing the contours and the impacts on the communities.	See response to question 108.
112.	Across from the Bayswater Street neighborhood there is a blast fence. This helps to reduce some impact from operations on the 22's. Will the Port Authority/FAA try again to remove the blast fence? What impact does the blast fence have on the proposal to reduce the landing minimum on 22 arrivals?	In December 2000, Massport filed an ENF to remove the blast fence because of aircraft safety concerns. Massport's analysis showed that the benefits of the blast fence to the Bayswater community are very minimal and better results could be achieved through mitigation. Massport provided funds to the Bayswater Blast Fence Committee (BFC) to hire an independent consultant to study Massport's proposal. MEPA held a public hearing in January 2000 and the public comment period was extended through February 9, 2001. Massport received a MEPA Certificate on February 23, 2001 stating that no additional environmental analysis was required.
113.	It is necessary to have more information about the Centerfield Taxiway and its relationship to gateholds and capacity. From a community perspective it seems that the airlines and airport would move passengers from the terminal onto planes, then have the planes move onto the much longer taxiway to park and wait for take-off openings. This gives the impression that delays are being addressed but it puts more aircraft in between two communities for longer times. Noise and pollution impacts on East Boston and Winthrop need to be re-evaluated and reviewed by people in these close-in neighborhoods and by the FAA and Massport.	Section 3.3.1 of the Supplemental DEIS describes the operational benefits of the Centerfield Taxiway. It will reduce taxiing delays for arriving and departing flights, and will reduce the number of aircraft queued up in the northern sector of the airfield. The Centerfield Taxiway will be an active operations area of the airfield and therefore not available to use as an overflow parking area as suggested by the question. It will have no influence on airline schedules, which are limited by the gates available at Logan terminals.
114.	On the South Shore there is an issue with the noise as recorded on the microphone at the high school. What is a sample of the recorded noise there over a period of time? How does the actual recording of the noise jibe with the INM model? How many times	Since the late-1997 upgrade to Massport's permanent noise monitoring system, aircraft-only DNL sound levels have been measured continuously 24 hours a day, 7 days a week, 365 days a year at Hull High School and other sites surrounding Logan Airport. The data are presented as annual average values and have been reported in the

#	Comment	Response
	is the noise measured at over 60 dB? How does the noise measurement correlate with the flight track usage?	1998 Annual Update to the Logan Airport Generic Environmental Impact Report (GEIR) and the 1999 Environmental Planning and Status Report (ESPR). At Hull High School, in particular, the difference between these measured values and the INM-generated noise contours that are also produced in conjunction with these documents were 1.1 decibels in 1998 and 0.6 decibels in 1999. In each case, the measured levels were slightly higher than the modeled contours; however, these differences are considered small and represent extremely good correlation between measured and modeled noise exposure. Measurement data have not been examined further to identify how many times the sound level has exceeded 60 dBA.
115.	From the South Shore is a request to describe the so called "over the water" track. Exactly when and how does the plane fly over water? How low and how often does the track take the planes over populated areas? Please show moving computer graphics to demonstrate the flight tracks over the South Shore.	Aircraft on straight-in arrival tracks to the Runway 32 and 33 ends fly over water longer before overflying communities than aircraft arriving to any other runway end. Please refer to the Flight Tracks presented in Chapter 6 of this Supplemental DEIS/FEIR. The tracks have been expanded to cover a broader geographic area and include altitudes.
116.	From Winthrop comes the question about Sunday morning heavy odor and constant revving sound. Why does this happen?	The temporal data indicate less jet and turboprop aircraft activity on Sunday mornings than weekday mornings and, in most cases, Saturday mornings. However, it is possible that on Sundays, residents of Winthrop are more likely to be out-of-doors working around the house, playing, or reading the newspaper. Mornings are also the worst time for atmospheric inversions. The combination of these two latter factors could result in these neighbors noticing the odors and noise more on Sunday mornings than on others. The source of the "constant revving sound" on Sunday mornings is unknown.

Appendix B
Regional Transportation

- B.1 Amtrak Memorandum Regarding Ridership Projections for Acela Service
- B.2 Amtrak letter regarding Availability of updated passenger projections for Amtrak's Acela Express service
- B.3 Environmental Impacts of Activity at Regional Airports
- B.4 New England Governors' Conference Resolution Furthering the Regional Transportation System
- B.5 Overview of Proposed New England Airport System Study Update – February 2001

Amtrak Memorandum Regarding Ridership Projections
for Acela Service

HARRIS

MEMORANDUM

TO:	Beverly Jones, SH&E	**DATE:**	January 8, 2001
FROM:	Joanne Haracz	**RE:**	Amtrak Ridership Projections

This memo documents my January 8, 2001 phone conversation with Russ Hall of Amtrak regarding the current status of ridership projections for Acela service on the Northeast Corridor. Mr. Hall informed me that new ridership projections were underdevelopment, but were not publicly available at the current time.

National Railroad Passenger Corporation, 30th and Market Streets, Philadelphia, PA 19104

Amtrak

October 14, 1999

Joanne Haracz, AICP
Planning Department Manager
Frederic R. Harris, Inc.
66 Long Wharf
Boston, MA 02110

Dear Ms. Haracz:

Thank you for you recent letter inquiring about the availability of ridership projections for Amtrak's *Acela Express* and *Acela Regional* service. Specifically, you requested information about projected station boardings and alightings, estimated ridership between New York and Boston, fare structure and details of the operating plan for Acela service.

You may be aware that the manufacturers of the high-speed trainset recently informed Amtrak of a delay in the delivery of the new trainsets for the *Acela Express* service. For that reason, the operating plans for *Acela Express* and *Acela Regional* service are still being refined. The operating plan is an integral component in preparing projections of ridership, and any projections based on interim plans would be unreliable for planning purposes.

I regret that we cannot provide you with specific information you have requested. I encourage you to contact me in the coming months when we may be better able to provide some of data you requested. You can reach me at (215) 349-3324.

Sincerely,

Nicole Seitz
Government Affairs Officer

ENVIRONMENTAL IMPACTS OF INCREASED TRAFFIC AT REGIONAL AIRPORTS

INTRODUCTION

The Secretary of the Massachusetts Executive Office of Environmental Affairs (EOEA) and the Massachusetts Department of Environmental Protection (DEP) have expressed the need to understand the environmental impacts of increased growth at the regional airports. However, the Secretary also acknowledged the difficulties of presenting cumulative impacts for physically unrelated projects located in different states and in different stages of the planning and environmental review processes. In light of these difficulties, the Secretary specifically directed Massport to summarize the environmental impacts of the regional airports, as they have been described in existing environmental documents and reports.

DOCUMENTS REVIEWED

Massport collected and reviewed the latest available documents for the principal regional airports surrounding Logan, i.e., Manchester, T.F. Green, Worcester and Hanscom Field. The available environmental studies done for Manchester and T.F. Green were completed prior to the entry of Southwest Airlines and other low-fare carriers at those airports. Nevertheless, the reported impacts give an indication of the degree of environmental exposure that results from growth at these airports.

Table 1 - Available Environmental Documents for the Regional Airports

Airport	Lead Agency	Document	Principal Proposed Actions	Base Year	Base Year Activity	Analysis Year	Analysis Year Activity
Manchester	FAA	Final Environmental Impact Statement, Manchester Airport Master Plan Update, June 1997	• Reconstruct and Lengthen Runways • Expand Terminal Building (+23 aircraft parking positions) • Improve Ground Access • Build New Parking Garage	1995	Operations: 85,257 Passengers: 902,000	2015	Operations: 155,500 Passengers: 3,380,000
Providence	Rhode Island Airport Corporation	Final Master Plan Update, T.F. Green State Airport March 1999	• Construct new parallel taxiways for Rwys 5R-23L • Construct Runway 34 Holding Apron • Regrade RSA beyond 34 end of Runway 16-34 • Pavement rehabilitation for Rwy 16-34 • Rwy 16 threshold displacement • Relocate Taxiway K • Removal of Hangar 1	1993	Operations: 122,588 Passengers: 2,373,000	2015	Operations: 137,115 Passengers: 5,367,150
Worcester	FAA	Final Supplemental Environmental Impact Statement/Report, Worcester Airport – 5 Year Plan of Improvements, December 1995	• Construct parallel taxiway for Rwy 11-29 • Reconstruct Rwy 15-33 and RSA's for 15-33 • Realign taxiways • Reconstruct terminal apron	1993	Operations: 73,195 Passengers: 191,472	1998	Operations: 78,147 Passengers: 232,736
Hanscom	Massport	Hanscom Field 1995 GEIR Update, April 1997	*No Physical Improvements Studied* *The HGEIR analyzed various scenarios of future growth including a 3% AAG with Regional Commuter Service*	1995	Operations: 190,282 Passengers: 5,228	2010 "3% Growth Scenario with Regional Commuter Service"	Operations: 296,500 Passengers: 216,906

SUMMARY OF DOCUMENTED ENVIRONMENTAL IMPACTS

Manchester Airport

Table 2 – Summary of Environmental Impacts of Preferred Alternative for Manchester Airport Final Environmental Impact Statement

Impact Category	Impacts
Noise	• Projected area within the DNL 65dB contour for the Proposed Action is 2.97 square miles compared to 4.58 square miles in 1995. • Noise exposed population is projected to decline from 6,575 in 1995 to 2,270 in 2015. After 34 homes are purchased, the noise exposure for 2015 is 1,044 people.
Social Impacts	• The acquisition of several properties is necessary for the construction of proposed access road improvements and Runway 6/24 reconstruction. Total acquisition of 117 properties: 97 residences; 2 commercial properties; 18 vacant parcels and a church, school and day care center.
Air Quality	• Locally, CO, VOC and NO_x increase under the preferred alternative. Projected emissions are within the de minimis levels of EPA's General Conformity regulations. • Regionally, there is an air quality benefit since greater use of Manchester translates into fewer passengers driving to Logan Airport and hence fewer vehicle miles traveled (VMT's) in the region. In 2015, regional emissions would be reduced as follows: CO –17.8%; VOCs –16.7%; and NO_x –12.3%.
Water Quality	• Preferred Alternative may potentially affect both groundwater and surface water quality. • Impacts to groundwater resources may occur due to a reduction in recharge caused by an increase in impervious surfaces. • Increased amounts of glycol-based deicing fluids may result in high BOD discharges to Little Cohas Brook. • No substantial changes in the quantity of stormwater run-off due to reconstruction and upgrading of stormwater drainage system.
Section 4(f) and 6(f) Parklands	None
Historic and Archaeological Resources	• The Preferred Alternative would impact 4 of 5 historic archaeological properties identified as eligible for the National Register of Historic Properties and 7 of 9 sites considered sensitive for prehistoric archaeological resources.
Ecosystems	• 13.02 acres of wetlands would be affected by fill and stream relocation associated with the Preferred Action. 11.52 of these acres are associated with the extension of Runway 17/35 and the relocation of Little Cohas Brook. • Impacts to the Little Cohas Brook habitat include relocating the stream and filling existing wetland habitat. Direct impacts are expected to occur to the resident species and less mobile species, while the indirect impact would be limiting wildlife access to the stream. • No significant impacts to the bald eagle, a federally-protected species. • Minor impacts to the state-listed endangered species, the upland sandpiper, will be mitigated. • Two state-protected flora species of special concern, the single mountain laurel plant and a few clusters of trailing arbutus in the vicinity of Little Cohas Brook, would be affected. However, these occur on airport property and therefore mitigation is not required.

T.F. Green/Providence Airport

The last Environmental Impact Statement (a State document) for the T.F. Green Airport was for the Terminal Area Plan and was completed in 1990. A more recent planning document, the Final Master Plan Update, was completed in March 1999. The Final Master Plan Update provides an environmental overview that identifies potential significant environmental impacts of planned development projects at T.F. Green Airport. Those potential impacts are summarized below.

Noise

The proposed improvements in the 1999 Master Plan Update are not expected to significantly change noise patterns or the number of affected areas since no new runway development is proposed. The most recent Noise Exposure Maps for T.F. Green, which were prepared for 1993 actual and 1998 projected operational activity were approved by the FAA in April 1995. A Part 150 Noise Study was recently completed.

Table 3 - T.F. Green Baseline 1993 and Forecast 1998 Noise Impacts of DNL 65 dB and Greater

	1993	1998	Change
Total Area (sq. mi.)	3.15	3.03	-3.8%
Off-Airport Area (sq. mi.)	2.09	1.99	-4.80%
Number of Dwellings	2,170	2,065	-4.7%
Number of Residents	5,890	5,600	-5.0%

Source: Wyle Research report WR 94-19m revised Noise Exposure Maps for T.F. Green State Airport, April 1995.

Table 4 - Overview of Potential Environmental Impacts of 1999 T.F. Green Airport Master Plan Improvements

Impact Category	Impacts
Compatible Land Use	• Master Plan improvements are not expected to significantly change the compatibility of land use within the airport vicinity.
Social Impacts	• None
Air Quality	• The T.F. Green Airport lies within the Metropolitan Providence Interstate Air Quality Control Region (AQCR). This AQCR, as well as the entire state of Rhode Island, has attainment status for all of the primary pollutants, except ozone (O_3). The Rhode Island Department of Environmental Management (RIDEM) currently inventories emissions in the area for hydrocarbons (HC), nitrogen oxides (NO_x), and carbon monoxide (CO), and has found these pollutant levels to be within attainment standards. • There appear to be no improvements resulting from the Master Plan Update that would significantly affect the air quality in the Airport vicinity.
Water Quality	• It is anticipated that the future Taxiway K relocation and the planned grading of the RSA at the approach end of Runway 34 will require a Water Quality Certification because these planned improvements may impact Federal or State jurisdictional wetland areas.
Section 4(f) and 6(f) Parklands	None
Historic and Archaeological Resources	• The planned grading of the RSA at the approach end of Runway 34 will require an archaeological assessment since the project is located near the Warwick Pond area. According to the Rhode Island Historical Preservation and Heritage Commission the Warwick Pond area may contain areas of archaeological significance.
Biotic Communities	• The grading of the RSA at the approach end of Runway 34 and the relocation of Taxiway K would most likely impact biotic communities, primarily vegetated wetlands and other natural vegetated areas. The effects on biotic communities will be addressed during the preparation of an Environmental Assessment.
Wetlands	• It is anticipated that the planned grading of the RSA at the approach end of Runway 34 and the relocation of Taxiway K will impact state and/or federal wetlands and/ or buffers. Potential impacts may require mitigation.
Floodplains	• It is anticipated that the planned grading of the RSA at the approach end of Runway 34 and the relocation of Taxiway K will impact land area in the 100-year floodplain as designated by the Federal Emergency Management Agency (FEMA).

Worcester Airport

Table 5- Final Supplemental Environmental Impact Statement/Report – Worcester Airport 5 Year Plan of Improvements

Impact Category	Impacts
Noise	• None of the proposed projects in the 5 Year Plan affect airport noise contours.
Water Quality	• Projects are have an overall long-term beneficial impact on the quality of water draining from the airport.
Air Quality	None
Wildlife Habitat	• A grassland management program was developed for the airport in cooperation with the Massachusetts Division of Fisheries and Wildlife. It was implemented in 1995 to enhance wildlife habitat for grassland species of birds.
Traffic	• A traffic analysis of several intersections in the vicinity of the airport indicated no adverse impacts as a result of the 5 Year Plan improvements.
Section 4(f) Properties	None
Historic and Archaeological Resources	None
Biotic Communities	None
Wetlands	• Construction of the parallel taxiway to Runway 11-29 will require the unavoidable filling of 4.2 acres of wetland resources. Wetland replication on a greater than one-to-one basis was proposed for mitigation.
Floodplains	• Construction of the parallel taxiway to Runway 11-29 will require the filling of approximately 2 acres of floodplain.

Noise

The City of Worcester conducted a Part 150 Noise Study of the Worcester Airport from 1989 to 1991. A summary of the noise impacts from the Noise Exposure Map is presented below.

Table 6 – Summary of Worcester Noise Exposure Map Impacts

	Base Year 1989			Forecast Year 1994		
	60-65 dB	65-70 dB	70+ dB	60-65 dB	65-70 dB	70+ dB
Area (acres)	460	50	0	1094	337	7
Dwelling Units	23	0	0	216	1	0
Population	60	0	0	571	3	0

Hanscom Field

As directed by the EOEA Secretary, the 1995 Hanscom Field GEIR Update provided detailed 1995 baseline conditions at and around Hanscom and identified hypothetical future operations and land use scenarios and associated environmental impacts for forecast 2000 and 2010 operations. The environmental impacts of aircraft operations for the 2010/3% Growth scenario, which assumed robust growth in scheduled regional commercial services, are summarized below.

Table 7 – Summary of Environmental Impacts of Aircraft Operations for the Hanscom Field 2010/3% Growth Scenario

Impact Category	Impacts
Noise	• Significant increase in noise exposure due to predicted increased military operations. • 31 homes are predicted to be exposed to Day-Night Average Sound Levels greater than 65dB. • Total noise exposure from departures is predicted to increase from 114.0 in 1995 to 115.6 in 2010/3% Growth Scenario.
Air Quality	• Predicted aircraft and motor vehicle emissions are higher than in the 1995 Baseline due to (1) a shift in the fleet mix from single-engine piston aircraft to turboprops, jets and helicopters; (2) the increase in total operations; and (3) additional predicted roadway traffic. • Total emissions increase from 4.0% to 9.1% per year, depending on the pollutant. However, total Hanscom Field emissions remain small compared to total emissions for Middlesex County. • Hanscom is predicted to remain in full compliance with the National and Massachusetts Ambient Air Quality Standards (NAAQS) and the MA DEP 1-hour NO_2 Policy Guideline.

New England Governors' Conference Resolution Furthering the Regional Transportation System

The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Ten Park Plaza, Boston MA 02116-3969
Office of the Secretary

Argeo Paul Cellucci
Governor

Jane Swift
Lieutenant Governor

Kevin J. Sullivan
Secretary and MBTA Chairman

February 9, 2001

860 - 594 - 3000

Commissioner James Sullivan
Department of Transportation
2800 Berlin Turnpike
Office of the Commissioner
Newington, CT 06131-7546

Dear Commissioner Sullivan,

On behalf of Governor Cellucci and Lt. Governor Swift, we are pleased to invite you to join New England's transportation leaders for the first quarterly meeting of the New England Regional Transportation Coordinating Council on February 16, 2001 at 1:00 at Worcester Union Station Worcester, Massachusetts.

At the most recent New England Governors Regional Transportation Summit, the Governors agreed to establish the Council to oversee, guide, and implement regional policies and initiatives. Our cooperative efforts will help create an even more efficient regional intermodal system that continues to support New England's participation in the global economy. A copy of the resolution is attached.

We expect the Council meetings will be held once every quarter, as is contemplated in the resolution, and this first meeting will be an organizational meeting to establish the goals of the Council and a timeline for achieving our objectives.

We look forward to seeing you on February 16th. Please let Siobhan Perenick, at 617-973-7013, know who will be attending the meeting with you.

Regards,

Kevin J. Sullivan
Secretary
Executive Office of Transportation and Construction

Virginia Buckingham
Executive Director & CEO
Massachusetts Port Authority

Telephone (617) 973-7000 TDD (617) 973-7306 Telefax (617) 973-8445

NEW ENGLAND GOVERNORS' CONFERENCE, INC.

76 Summer Stre
Boston, Massachusetts 02110-12
617-423-6900 • FAX 617-423-73
e-mail: negc@tiac.n
Internet: http://www.negc.o

NEW ENGLAND GOVERNORS' CONFERENCE, INC.

RESOLUTION NUMBER 154

A Resolution of the New England Governors' Conference, Inc. Furthering the Regional Transportation System

WHEREAS, New England's Governors recognize that an integrated regional transportation system is fundamental to the economic, social, and environmental well-being of the New England States; and

WHEREAS, New England is a unique region fully participating in the global economy and sharing a highly skilled workforce that is more mobile than ever; and

WHEREAS, the development of an efficient intermodal regional transportation system that maximizes options, increases connections and continues to promote economic growth is a priority of the New England Governors' Conference, Inc.; and

WHEREAS, New England has been engaged in regional transportation planning for the past decade and there is now emerging a New England Regional Transportation System; and

WHEREAS, the New England states can build on this transportation network to create an even more efficient regional intermodal system that continues to support New England's participation in the global economy.

NOW THEREFORE BE IT RESOLVED THAT the New England Governors' Conference, Inc. will

Re-establish the New England Governors' Conference, Inc. Regional Transportation Coordinating Council, with two members appointed by each Governor. This body will meet quarterly to oversee, guide and implement regionalization policy and initiatives;

Petition Congress to provide dedicated funding to support New England's regional transportation planning efforts and invite the federal transportation agencies to participate as members of the New England Governors' Conference, Inc. Regional Transportation Coordinating Council; and

Petition the US Department of Transportation to work with the Congressional delegation to declare New England a "unique" region in order to allow regulatory flexibility in applying federal transportation policy; and

BE IT FURTHER RESOLVED THAT The New England Governors Conference, Inc. agrees that the New England transportation agencies, along with the Federal Aviation Administration, will embark on the next phase of study, which will evaluate ways to:

Increase domestic and international air service at the regional airports;

Increase non-scheduled charter service and air cargo activity at the regional airports;

Increase HOV/ground transportation and rail alternatives to service the regional airports; and

Develop an air service action plan for the regional airports.

AND BE IT FURTHER RESOLVED THAT The New England Governors' Conference, Inc. also agrees that its Regional Transportation Coordinating Council will:

Survey regional passenger hubs and strive to reduce the differences that passengers experience in making a trip via a combination of local and inter-city transit systems (i.e., local bus, subway and inter-city rail or bus) by developing compatible passenger information systems, including:

door to door web based transit trip planning
consistent signage and electronic information at stations and terminals
locating traveler conveniences such as visitor information centers,
ATMs, and on-site ticket sales for connecting modes

Encourage long distance travel options by investing in new systems for remote check in and luggage transfers between train, bus and air;

Cooperate to integrate New England's transit and turnpike systems by integrating the fare collection and toll technologies;

Study opportunities to improve the regional rail system, including safe and convenient passenger service on the region's designated high-speed rail corridors;

Maintain the states' commitment to enhance the accessibility of the regional system through station design and equipment choice, including lift equipped inter-city buses and information systems for the hearing impaired and the visually impaired;

Establish a New England Intermodal Freight Alliance to analyze key freight corridors in and through New England, including the way that freight and passenger systems share a single corridor;

Identify physical constraints, environmental benefits and market opportunities for each corridor and mode;

Investigate different forms of public-private partnerships to enhance the freight system and assure adequate and continuing maintenance and upgrades;

Offer technical assistance to local planners to identify and prioritize projects that will increase the efficiency of the freight system while respecting residential neighborhoods;

Work with the travel industry to tie the regional airports into the reservation system of travel agents and Internet sites when visitors are looking to access New England; and

Explore the creation of an electronic database (New England Regional Ground Access System) containing schedules of all modes of transportation to the region's airports.

ADOPTION CERTIFIED BY THE NEW ENGLAND GOVERNORS' CONFERENCE, INC. ON FEBRUARY 27, 2001.

Governor John G. Rowland
Governor of Connecticut
Chairman

Overview of Proposed New England Airport System Study Update – February 2001

FAA Regional System Plan Update

- Introduction/Background
- Study Purpose
- Study Background
- Study Organization
- Major Issues
- Study Structure/Content
- Public Consultation
- Schedule

FAA Regional System Plan Update

Introduction/Background

- Evolving roles of New England airports within the regional aviation system.
- Growing aviation demand due to increases in income, lowered fares, and changes in the travel patterns of our lives and occupations.
- The FAA recent forecast of an additional 23 million annual passengers above current levels within the New England region by 2010.

FAA Regional System Plan Update

Introduction/Background (continued)

- Need to identify opportunities that may exist to further enhance the operation of New England's regional system of airports, including an examination of the potential of other transportation modes to either provide alternative services.

- Interest raised through the ongoing *Logan Airside Improvements Planning Study*. A consistent theme of comments on this project has been that improvements at Logan Airport should be considered within the context of regional transportation planning.

FAA Regional System Plan Update

Study Purpose

Provide the background and analytical framework for a common understanding of:

- The current and future demand for aviation services across the New England Region,
- The roles of the major scheduled passenger service airports,
- The inter-relationships of those roles on the system,
- The constraints and challenges that will be faced by current patterns of service, and
- The identification of policies, strategies and infrastructure that would enhance system performance.

FAA Regional System Plan Update

Study Background

- Boston Regional Airport System Study *(1989)*
- Second Major Airport (SMA) Study *(1990)*
- Strategic Assessment Report (SAR) *(1993)*
- New England Transportation Initiative (NETI) *(1995)*
- New England Regional Air Service Study *(1995)*

FAA Regional System Plan Update

Regional Airports in 1995 Study

State	*City*	*Airport*	
Connecticut	Hartford	Bradley International Airport	(BDL)
	New Haven	Tweed-New Haven Airport	(HNV)
Maine	Bangor	Bangor International Airport	(BGR)
	Portland	Portland International Jetport	(PWM)
Massachusetts	New Bedford	New Bedford Regional Airport	(EWB)
	Worcester	Worcester Regional Airport	(ORH)
New Hampshire	Manchester	Manchester Airport	(MHT)
Rhode Island	Providence	T.F. Green State Airport	(PVD)
Vermont	Burlington	Burlington International Airport	(BTV)

FAA Regional System Plan Update

Study Organization

- **Project Administration Group**. Massport and the State of Massachusetts would be the financial sponsors of the FAA grant. Massport would manage the grant and provide all administrative functions.
- **Project Management Team**. Six state aeronautical agencies and a representative from the hub airports. Project Management Team would be signatories of a Memorandum of Understanding (MOU) that would outline the guiding principles for the undertaking of the project. MOU would generally follow the MOU executed for the 1995 Regional Air Service Study.
- **Advisory Group**. Established to provide a forum for information sharing and peer review . Composed of a broad range of aviation and transportation technical specialists that would bring additional industry knowledge to the process.

FAA Regional System Plan Update

Major Issues to be Considered

- **Regional Jets**. Impacts of increase in RJs on services and routes offered at regional airports and the system as a whole.
  Potential for RJs to expand the demand for travel between the New England Region and short/medium range markets
- **Low Cost Carriers**. Impact on the system (i.e. demand stimulation, catchment area expansion, other infrastructure improvements)
- **Other Transportation Modes**. What can be done to use other transportation modes more effectively as complements to the air service system?
- **Ground Access**. Opportunities to improve airport access and passenger convenience that would encourage use of the regional airports?
- Where can **charter**, **air cargo** and **corporate GA** be best served and how can it be accomplished?
- **Service Improvements** at the outlying markets

FAA Regional System Plan Update

Study Structure/Content

Two-Phase Process:

- **Phase I** of the study will address *regional aviation forecasting* and studies to facilitate a possible *reshaping of the market.*
- **Phase II** will consider *Public Policy and Action Recommendations*

FAA Regional System Plan Update

Phase I Tasks

Task 1 –Regional Aviation Forecasting

- Review of existing and planned aviation forecasts
- Forecasts of passenger/charter demand at the city and town level within 100-mile radius of Boston and at county level for rest of region.
- Forecasts of regional cargo demand.
- Detailed forecasts of passenger demand by city pairs for all primary airports in the region sufficient to account for 75% of enplanements. (*may include onsite passenger surveys, ticket-lift analyses or other similar site-specific data collection efforts*).

FAA Regional System Plan Update

Phase I Tasks (continued)

Task 1 –Regional Aviation Forecasting

- Forecast of the region's age-cohort, income distribution and employment by significant industrial sector categories in order to understand major determinants of overall aviation demand within the region.
- Forecasts to be developed for 5 (2005) and 15 (2015) years.
- Forecasts of operations based upon passenger forecasts.

FAA Regional System Plan Update

Phase I Tasks

Task 2 – Shaping the Market

- Identify any new industry trends that might shape the market.
- Define primary catchment areas for the regional airports and identify shifts since the 1995 study. Explain reasons for any identified market area shifts.
- Conduct an inventory of existing and planned passenger, cargo, charter facilities and associated infrastructure that impact services at primary airports within the region.

FAA Regional System Plan Update

Phase I Tasks (continued)

Task 2 – Shaping the Market

- Identify ground access improvements that could enhance passenger and cargo demand at the regional airports.
- Identify range of services and costs of alternative transportation modes, including video-conferencing that have a potential to redistribute regional demand for aviation services. (*DOT Inter-modal group will furnish some of this*).

FAA Regional System Plan Update

Anticipated Phase I Products

- New regional passenger and cargo forecasts
- Updated passenger and cargo fleet forecasts
- Updated catchment areas
- Identification of new service market opportunities
- An understanding of facility needs to accommodate anticipated growth
- A work scope for Phase II
- Development of a public involvement program for Phase I and Phase II

FAA Regional System Plan Update

Phase II Public Policy and Action Recommendations

- Develop an implementation plan/program identifying major actions required to support a regional strategy to enhance air passenger service.
- Develop ongoing planning and evaluation capability to guide evolution of regional strategy as conditions develop beyond original assumptions.
- Evaluate major public policies, alternate airline strategies, federal aviation policies and regulations that could guide regional system planning.
- Identify federal aviation policies and regulations that could be a restriction to cooperative regional intermodal system planning.

FAA Regional System Plan Update

Public Consultation

- Public and agency consultation for input on the work scope and products
- Briefings on topics of high interest
- Consultation with congressional, business, environmental and community groups
- FAA will also coordinate this project within the context of ONEDOT
- Specific timeframes for public involvement have not been fully developed

FAA Regional System Plan Update

Preliminary Schedule

Scoping Activities	
Issue Request for Qualifications (RFQ)	February, 2001
Pre-Bid Briefing Meeting	March, 2001
Consultant Selection	March, 2001
Develop Detailed Work Program	April, 2001
System Planning Grant	April, 2001
Phase 1	Begin April 2001
Task 1 Report	August 2001
Task 2 Report	December 2001
Task 3 Phase II Work Program	January 2002
Phase 2	
Phase 2 Grant	January 2002
Phase 2 Report	September 2002

Appendix C
Delay

1998 DELAYSIM Results

Summary of LAIPP DELAYSIM Results
1998 Fleet

Case Name:	Actual Runway Use	PRAS Goal: Alt. 1 A	GEIR Use No Action
Average FAA configuration changes per day:		6.1	9.2
Average Workload Score:		61.9	97.0
Percentage of Equivalent Arrival Operations on 4 (PRAS Goal = 21.1 %)	36.7%	21.8%	36.7%
Percentage of Equivalent Arrival Operations on 9 (PRAS Goal = 0.0%) :	0.0%	0.1%	0.2%
Percentage of Equivalent Arrival Operations on 14 (PRAS Goal = Rwy 15)	0.0%	0.0%	0.0%
Percentage of Equivalent Arrival Operations on 15 (PRAS Goal = 8.4%)	1.2%	6.5%	1.2%
Percentage of Equivalent Arrival Operations on 22 (PRAS Goal = 6.5%)	11.9%	11.5%	11.8%
Percentage of Equivalent Arrival Operations on 27 (PRAS Goal = 21.7%)	21.7%	20.8%	21.6%
Percentage of Equivalent Arrival Operations on 32 (PRAS Goal = Rwy 33)	0.0%	6.5%	0.0%
Percentage of Equivalent Arrival Operations on 33 (PRAS Goal = 42.3%) :	28.6%	32.7%	28.5%
Percentage of Equivalent Departure Operations on 4 (PRAS Goal = 5.6%)	6.6%	7.7%	6.5%
Percentage of Equivalent Departure Operations on 9 (PRAS Goal = 13.3%)	29.9%	15.9%	29.7%
Percentage of Equivalent Departure Operations on 14 (PRAS Goal = Rwy 15)	0.0%	2.1%	0.0%
Percentage of Equivalent Departure Operations on 15 (PRAS Goal = 23.3%)	10.9%	19.1%	10.8%
Percentage of Equivalent Departure Operations on 22 (PRAS Goal = 28.0%)	30.9%	26.2%	30.8%
Percentage of Equivalent Departure Operations on 27 (PRAS Goal = 17.9%)	16.6%	17.0%	16.6%
Percentage of Equivalent Departure Operations on 32 (PRAS Goal = Rwy 33)	0.0%	0.0%	0.0%
Percentage of Equivalent Departure Operations on 33 (PRAS Goal = 11.9%):	5.2%	12.0%	5.5%
Sum of Absolute Deviations from PRAS Goals:	82.8	21.3	82.6
Sum of Squared Deviations from PRAS Goals:	997.4	59.4	991.1
Annual Hours of Dwell Exceedence Noise Area 1 (Art 4):		267	758
Annual Hours of Dwell Exceedence Noise Area 2 (Art 33):		2,939	107
Annual Hours of Dwell Exceedence Noise Area 3 (Dep 15):		580	86
Annual Hours of Dwell Exceedence Noise Area 4 (Dep 22):		318	774
Annual Hours of Dwell Exceedence Noise Area 5 (Dep 27):		227	50
Annual Hours of Dwell Exceedence Noise Area 6 (Art 22 / Dep 4):		658	2,043
Annual Hours of Dwell Exceedence Noise Area 7 (Art 27 / Dep 9):		991	2,164
Annual Hours of Dwell Exceedence Noise Area 8 (Art 15 / Dep 33):		787	110
Total Annual Hours of Dwell Exceedence:		6,767	6,092
Annual Hours of Persistence Exceedence Noise Area 1 (Art 4):		237	959
Annual Hours of Persistence Exceedence Noise Area 2 (Art 33):		4,715	23
Annual Hours of Persistence Exceedence Noise Area 3 (Dep 15):		311	80
Annual Hours of Persistence Exceedence Noise Area 4 (Dep 22):		58	1,218
Annual Hours of Persistence Exceedence Noise Area 5 (Dep 27):		143	18
Annual Hours of Persistence Exceedence Noise Area 6 (Art 22 / Dep 4):		840	4,303
Annual Hours of Persistence Exceedence Noise Area 7 (Art 27 / Dep 9):		2,061	4,493
Annual Hours of Persistence Exceedence Noise Area 8 (Art 15 / Dep 33):		1,712	31
Total Annual Hours of Persistence Exceedence:		10,077	11,125
Percentage of Delays in VFR1 Weather (78.3% of weather is VFRI)		13.7%	36.5%
Percentage of Delays in VFR2 Weather (9.5% of weather is VFR2):		6.2%	6.1%
Percentage of Delays in IFR1 Weather (3.2% of weather is IFR1) :		25.4%	18.6%
Percentage of Delays in IFR2 Weather (7.4% of weather is IFF12):		46.8%	33.3%
Percentage of Delays in IFR3 Weather (1.6% of weather is IFR3)		7.9%	5.5%
Annual Operations:		513,811	513,811
Annual Hours of Delay;		81,840	119,900
Average Delay per Operation (minutes)		9.6	14.0
Average Delay per Operation with Cancellations (minutes):		8.4	12.4

Notes: 96 weather w1gusts, 98 demand, 97-98 fleet mix for capacities

Definitions of Alternatives.

1) Operational Improvements, Taxiway improvements, $150 Peak Hour Pricing Surcharge, 5000'Runway 14132
IA) Operational improvements, Taxiway Improvements, 5000'Runway 14132
2) Operational Improvements, Taxiway Improvements, $150 Peak Hour Pricing Surcharge
3) Operational Improvements, $150 Peak Hour Pricing Surcharge
4) Baseline

1998 GEIR Fleet

Rwy	Total Operations				Jet Operations				Equivalent Operations				Jet Operations - Day				Jet Operations - Night			
	Alt 4	Alt 2/3	Alt 1A	Alt 1	Alt 4	Alt 2/3	Alt 1A	Alt. 1	Alt. 4	Alt. 2/3	Alt. 1A	Alt. 1	Alt. 4	Alt. 2/3	Alt. 1A	Alt. 1	Alt. 4	Alt. 2/3	Alt. 1A	Alt. 1
4 Arr	105190.8		38312.1		60264.5		22617.9		129256.3		74225.4		52,598.7		16,883.7		7,665.8		5,734.2	
9 Arr	1415.6		9288		179.2		86.2		687.7		240.1		122.7		69.1		56.5		17.1	
14 Arr	0.0		0		0.0		0		0.0		0		0.0		0.0		0.0		0.0	
15 Arr	3868.9		16249.5		2849.0		14577.8		4387.1		22262		2,678.1		13,724.0		170.9		853.8	
22 Arr	58733.3		38331.6		11236.1		8151.9		41724 7		39330.7		7,848.5		4,687.6		3,387.6		3,464.3	
27 Arr	57592.5		41797.7		52114.3		40135.8		75972.3		70916.1		49,463.4		36,715 8		2,650.9		3,420.0	
32 Arr	0.0		60925.2		0.0		13935		0.0		22057.1		0.0		13,032.5		0.0		902.5	
33 Arr	30105.5		52002.6		22966.2		50104.8		100318.9		111520		14,371.5		43,280.9		8,594.7		6,823.9	
Total Arr	256906.5		256906.6		149609.2		149609.5		352347.0		340551.3		127,082.8		128,393.7		22,526.4		21,215.8	
4 Dep	46932.7		29461		13796.6		13796.6		22984.0		26310.1		12,775.8		12,406 2		1,020.8		1,390.4	
9 Dep	60878.5		27134.6		46932.0		21054		104752.0		54104		40,507 6		17,381.8		6,424 4		3,672.2	
14 Dep	0.0		15485		0.0		4804.8		0.0		7077 6		0.0		4,552.3		0.0		252.5	
15 Dep	7364 3		11869		6133.1		9847.8		38051.0		65183.6		2,586.7		3,699 4		3,546.4		6,148.4	
22 Dep	109323.8		71356.8		61786.9		41058.3		108567.0		89130.1		56,589.1		35,717.0		5,197.8		5,341.3	
27 Dep	18166.1		51867.2		15085.5		35898.7		58497.0		57842		10,262.0		33,460.6		4,823.5		2,438.1	
32 Dep	0.0		0		0.0		0		0.0		0		0.0		0.0		0.0		0.0	
33 Dep	14240.9		49732.9		5875.2		23149.1		19497 6		40904.5		4,361.6		21,176.3		1,513.6		1,972 8	
Total Dep	256906.3		256906.5		149609.3		149609.4		352348.6		340551.7		127,082.7		128,393.6		22,526.6		21,215.8	

Note that Alternative 4 uses GEIR runway use, rather than DELAYSIM PRAS goal criteria

Annual Delay Hours by Weather Category

1998	Baseline	Alt. 1 A
VFR1 Weather (78.6%)	43,785	11,237
VFR2 Weather (8.7%)	7,300	5,071
IFR1 Weather (3.6%)	22,283	20,752
IFR2 Weather (7.3%)	39,965	38,334
IFR3 Weather (1.9%)	6,567	6,446
Total VFR	51,085	16,308
Total IFR	68,815	65,532
Total VFR+IFR	119,900	81,840

Measures of Delay

The official FAA delays database is the Air Traffic Operations Network (OPSNET), in which FAA personnel record only the number of flights that are delayed 15 or more minutes at a particular facility. The new FAA Consolidated Operations and Delay Analysis System (CODAS) uses existing data sources to produce estimates of flight delays by phase of flight but not by cause. In addition, the U.S. Department of Transportation (DOT) publishes the Air Travel Consumer Report (ATCR) that reflects on-time performance relative to published flight schedules. Each of these delay reporting systems was designed for a specific and different purpose, is based on different data sources or methodologies, and reports flight delays differently. As a result, these measures of delay are not directly comparable and none provides a comprehensive measure of the flight delays at an airport and their causes. However, these measures are useful for identifying which airports in the national aviation system are most affected by delay.

■ FAA Air Traffic Operations Network (OPSNET)

OPSNET is the official FAA delay reporting system for air traffic management purposes.[1] It is used by the FAA on a daily basis to identify where and when delays occurred in the national aviation system, the source of the delays, and their duration.

OPSNET has two major limitations that make it an inappropriate measure of the total delay incurred at Logan in a given year. First, the OPSNET system understates the total amount of delays in the national aviation system. Delays less than 15 minutes are not recorded by OPSNET, nor does it record aircraft on VFR flight plans or airborne delays other than for holding patterns (i.e., speed reductions are not counted). Additionally, total delays are understated because flight delays are recorded separately by each facility. Specifically, FAA personnel in each en route sector and major terminal area manually record the total number of IFR aircraft that suffered more than 15 minutes of delay under their control. Because the 15-minute threshold applies separately to each facility that controls a flight, total delays are understated. For example, a flight from Washington, DC to Boston that may have suffered three 10-minute delays at three different locations (e.g., taxiing out at Washington, in the New York en route sector, and in the Boston terminal area) will not be recorded in the OPSNET data, despite having incurred a cumulative 30 minutes of delay.[2] Finally, OPSNET does not include cancelled flights.

▼

1 OPSNET was formerly known as the Air Traffic Operations Management System (ATOMS).
2 Airside modeling only counts delays attributable to congestion at Logan Airport.

Second, the OPSNET data records the number of delayed flights rather than the extent of the delay incurred. All delayed flights that meet the 15-minute threshold are treated equally, i.e., a flight which was delayed 15 minutes during arrival and one which experienced a 3-hour departure delay are each recorded as a single delay in the OPSNET data. Thus, OPSNET cannot be used to determine the hours of delay incurred at Logan each year.

Because of these limitations, OPSNET is most useful as a comparative indicator of national aviation system performance rather than as an absolute measure of delay at a single airport.

■ DOT Air Travel Consumer Report (ATCR)

The Department of Transportation's Office of Aviation Enforcement and Proceedings issues the ATCR to provide consumers with information about the on-time performance of airline flights. It is based on Airline Service Quality Performance (ASQP) operational data filed by major air carriers and on scheduled times published in the Official Airline Guide (OAG).

The ATCR data is of limited value for measuring total delays at Logan because it is an incomplete database that may seriously underestimate true delays and it attributes delays to airports that may not be responsible for the delay. A serious source of understatement is due to the fact that the ATCR only reports domestic delayed flights for the ten largest US airlines.[3] This means that no information on international or regional flights is contained in ATCR, an important gap for Logan where commuter and international flights are 53 percent of total operations.[4] Cancelled flights or those delayed by aircraft mechanical problems are also not reported in this database.

While the ATCR, like OPSNET, uses a 15-minute threshold to define a "delayed" flight, the ATCR calculates delays for individual flights by comparing actual and scheduled departure and arrival times. This method of counting delays and the fact that airlines normally make an allowance in their published schedules for expected ATC and airport delays is another source of understatement. For instance, the scheduled arrival and departure times for a flight may already include a 10-minute allowance for delay. Thus, if the flight arrives 25 minutes after its scheduled arrival, the flight actually incurred 35 minutes of delay, not 25. In this respect the "on-time arrival statistics" published in

[3] Based on airlines with one percent or more of total domestic scheduled passenger revenue in the US. These include: Alaska Airlines, America West Airlines, American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, Southwest Airlines, Trans World Airlines, United Airlines, US Airlines.

[4] Based on Massport statistics for the 12 months ended June 30, 1999.

the Air Travel Consumer Report each month underestimate the true incidence of arrival delays of 15 minutes or more.

The ATCR records delays as small as one minute, and can aggregate delays by individual flight, by carrier and by airport. For an individual flight the ATCR includes delays incurred on all upstream legs. For example, a flight from St. Louis via Pittsburgh to Boston, which is scheduled to arrive at Logan at 10:15, but actually arrives at 10:40, is reported to have a delay of 25 minutes at Boston. It does not matter where in the system the delay occurred. The flight is counted as a delayed flight if the delay occurred at Logan, en route, at Pittsburgh, or even if the flight was 25 minutes late departing St. Louis. While the ATCR "debits" Logan for arrival delays that may be caused by late departures from the point of origin, it would be inappropriate from an airport planning perspective to count these as Logan related delays.

■ FAA Consolidated Operations and Delay Analysis System (CODAS)

The Consolidated Operations and Delay Analysis System was created by the FAA Office of Aviation Policy and Plans (APO) to provide more consistent estimates of aircraft delay by combining data from several existing sources. CODAS, which was implemented in January 1997, calculates delays by phase of flight: gate-delay, taxi-out delay, airborne delay and taxi-in delay.

CODAS integrates data from two primary sources: the FAA's Enhanced Traffic Management System (ETMS) and the DOT's Airline Service Quality Performance (ASQP) System. Back up data come from the Official Airline Guide (OAG), the carriers' Computerized Reservation Systems (CRS) and the Air Transport Association (ATA). In addition, APO independently estimates unimpeded taxi times. Each of these data sources was independently created for another purpose and each has its own strengths and limitations.

While CODAS represents a significant improvement in the tabulation of flight delays, it is not without limitations as a tool for airport planners. For one thing, it measures delay where it occurs, not where the delay is caused, e.g., gate-hold delays at Los Angeles due to congestion at Logan are recorded as delays at Los Angeles. CODAS also understates the actual delays in several ways. First, although it only tracks IFR flights, many of these are not included. For example, the two available years of CODAS reports contain only 75 percent of the Logan operations that are in the OPSNET database. Finally, as with all the measurement systems, flight cancellations are not included.

Overview of Delay Measures

Each of the FAA and U.S. DOT delay databases measures a different aspect of delay. OPSNET counts only the number of flights that suffer a delay of more than fifteen minutes at a single element of the ATC system (sector or airport). By concentrating on single elements separately, without regard to overall flight performance, OPSNET underestimates by a wide margin the number of aircraft truly delayed by more than 15 minutes. ATCR measures delay in terms of deviation from the scheduled arrival time of the aircraft. Insofar as airline schedules already include allowances for expected delays, ATCR statistics may seriously underestimate true delays. ATCR is not concerned with the causes of delay and may "debit" an airport for delays that are due to "upstream" congestion or to other events that have nothing to do with that airport. CODAS is the most useful of the available databases since it includes the ASQP measurements, actual FAA operations data, airline schedules and other information. However, it does not include any information on delay causes, it misses many flights, and it generally under-reports airport delays. Table 1provides a summary of the features and limitations of each of the existing sources of flight delays.

Table 1
Comparison of Flight Delay Measurement Sources

Source	Features	Limitations
OPSNET (FAA)	Measures number of delayed flights Official FAA delays source Delays computed for each FAA facility	Does not count delays less than 15 minutes Does not count cumulative delay across flight sectors Excludes VFR flights Excludes taxi-in delays Excludes linear airborne delays Omits flight cancellations
CODAS (FAA)	Minutes of delay by phase of flight Delays for all major US airports Combines best of available data on schedules and actual times	Excludes VFR flights Not all flights recorded, esp. commuters and busy times No causal information Runway configurations ignored Estimates of unimpeded taxi times Flight cancellations omitted
ATCR (DOT)	Monthly consumer reports Actual aircraft arrival/departure times Delays by airport, airline and individual flight	Only 10 largest US airlines included Excludes regional and international flights No causal information No information on flight phase "Upstream" delays included

Simulation Modeling for Airport Delay Estimates

Since none of the delay measurement systems presents a comprehensive picture of actual delays at an airport, estimates of the total airfield delay have been developed using computer simulation models. DELAYSIM, the model used for the Logan Airside Improvements Planning Project, estimates that Logan experienced 120,000 annual hours of runway delay in 1998. (See Chapter 4 for a more detailed discussion of delay models.) This is more than six times the FAA's 20,000 annual hour threshold for identifying delay problem airports. However, even these annualized delay hours obscure the true impact of delay at Logan. During periods of excessive northwest winds, delays can exceed three hours per operation. (See Northwest/Southeast Winds Case Study in Appendix I in the Draft EIS/EIR).

The FAA uses airfield simulation models, not historic data, for evaluating major airport improvements such as the Logan Airfield Improvements.[5] FAA orders require the use of simulation when calculating benefits of major investments, like runways, that involve the use of discretionary funds. Simulation has the essential ability of projecting future performance in response to proposed changes in facilities. It can track and aggregate smaller levels of delays as well as the aggregate delay across all phases of operation. Simulations do not normally cancel flights during periods of extreme delay even though airlines are often forced to cancel flights in these conditions. By estimating the delay that would have occurred, the simulation accounts for the cost of such cancellations.

Simulation models are not validated by comparing them to historic delay data since the FAA does not have a system to comprehensively record the appropriate delays. Instead, simulations are validated by comparison with airfield performance characteristics such as hourly capacity, runway occupancy times, runway exit distributions, taxiway routings, etc. In addition, air traffic control specialists are consulted regarding key assumptions in the model.

5 John Silva, Environment Program Manager, FAA New England Region, letter to Betty Desrosiers, Massport, dated June 14, 1999.

2015 RJ Fleet DELAYSIM Results

Annual Delay Hours by Weather Category

2015 High Regional Jet Scenario	Baseline	Alt. 2/3	Alt 1A	Alt 1
VFR1 Weather (79.6%)	157,673	122,047	70,707	48,212
VFR2 Weather (8.6%)	35,209	25,257	26,848	19,794
IFR1 Weather (3.9%)	49,294	41,760	44,250	38,992
IFR2 Weather (6.7%)	81,572	69,395	75,128	67,084
IFR3 Weather (1.2%)	48,472	45,850	46,557	45,129
Total VFR	192,882	147,304	97,554	68,006
Total IFR	179,338	157,005	165,935	151,205
Total VFR + IFR	372,220	304,309	263,489	219,211

Summary of Logan Airside DELAYSIM Results
2015 High Regional Jet Fleet

	Case Name	PRAS Goal	1999 Actual	Alt 4	Alt 2/3	Alt 1A	Alt 1
Pct of Equivalent Arrival Operations	Rwy 4	21.1%	30.6%	43.6%	42.9%	31.8%	31.9%
	Rwy 9	0.0%	0.0%	0.1%	0.1%	0.9%	0.1%
	Rwy 14	N/A	0.0%	0.0%	0.0%	0.0%	0.0%
	Rwy 15	8.4%	2.2%	0.6%	0.7%	2.4%	2.3%
	Rwy 22	6.5%	15.1%	26.7%	26.1%	20.1%	17.9%
	Rwy 27	21.7%	22.5%	11.9%	12.8%	7.4%	9.1%
	Rwy 32	N/A	0.0%	0.0%	0.0%	7.6%	9.2%
	Rwy 33	42.3%	29.6%	17.1%	17.5%	29.7%	29.5%
Pct of Equivalent Departure Operations	Rwy 4	5.6%	6.3%	9.4%	8.1%	8.2%	6.9%
	Rwy 9	13.3%	25.5%	36.6%	37.9%	28.4%	30.1%
	Rwy 14	N/A	0.0%	0.0%	0.0%	0.1%	0.2%
	Rwy 15	23.3%	11.5%	6.3%	6.5%	8.6%	8.5%
	Rwy 22	28.0%	33.9%	38.0%	38.2%	22.9%	21.5%
	Rwy 27	17.9%	17.0%	7.0%	6.6%	21.6%	21.6%
	Rwy 32	N/A	0.0%	0.0%	0.0%	0.0%	0.0%
	Rwy 33	11.9%	5.8%	2.7%	2.7%	10.2%	11.2%
Abs. Dev from PRAS Goals			75.4	159.8	157.5	93.4	88.3
PRAS Performance Index			726.0	2,852.9	2,822.6	1,058.0	1,009.3
Hours of Annual Dwell Exceedence	Arr 4			1,239	1,244	717	692
	Arr 33			73	74	701	665
	Dep 15			62	0	56	3
	Dep 22			658	670	99	121
	Dep 27			33	33	519	453
	Arr 22 / Dep 4			2,448	2,726	908	1,077
	Arr 27 . Dep 9			2,439	2,372	1,149	1,059
	Arr 15 / Dep 33			70	67	775	662
	Total			7,022	7,186	4,923	4,732
Hours of Annual Persistence Exceedence	Arr 4			1,930	1,866	909	924
	Arr 33			9	10	896	839
	Dep 15			45	0	5	0
	Dep 22			774	835	4	35
	Dep 27			6	6	451	395
	Arr 22 / Dep 4			4,779	5,203	1,502	2,167
	Arr 27 . Dep 9			4,839	4,742	2,076	2,134
	Arr 15 / Dep 33			9	9	1,313	973
	Total			12,390	12,671	7,157	7,467
Pct Delays in VFR1 (79.6% of time)				42.4%	40.1%	26.8%	22.0%
Pct Delays in VFR2 (8.6% of time)				9.5%	8.3%	10.2%	9.0%
Pct Delays in IFR1 (3.9% of time)				13.2%	13.7%	16.8%	17.8%
Pct Delays in IFR2 (6.7% of time)				21.9%	22.8%	28.5%	30.6%
Pct Delays in IFR3 (1.2% of time)				13.0%	15.1%	17.7%	20.6%
Pct Delays on Weekdays				85.7%	84.7%	83.7%	82.2%
Pct Delays on Weekends				14.3%	15.3%	16.3%	17.8%
Annual Operations				584,722	566,982	584,722	566,982
Annual Hours of Delay				372,220	304,309	263,489	219,211
	VFR			192,882	147,304	97,554	68,006
	IFR			179,338	157,005	165,935	151,205
Avg Delay per Op (mins)				38.2	32.2	27.0	23.2
Pct of Ops Delayed > 3 hrs				5.89%	4.97%	3.95%	3.39%
Delay Hours for Aircraft Delayed > 3hrs				196,998	162,335	138,301	117,986
Avg Delay per Op with Cancellations (mins)				28.6	24.0	20.0	16.8
Pct Change in Total Delay vs. Baseline					18.2%	29.2%	41.1%
Pct Change in Average Delay vs. Baseline					15.7%	29.2%	39.3%

Definitions of Alternatives

1) Operational Improvements, Taxiway Improvements, $150 Peak Hour Pricing Surcharge, 5000' Runway 14/32

1A) Operational Improvements, Taxiway Improvements, 5000' Runway 14/32

2) Operational Improvements, Taxiway Improvements, $150 Peak Hour Pricing Surcharge

3) Operational Improvements, $150 Peak Hour Pricing Surcharge

4) Baseline

Review of Forecast Regional Jet Utilization
Proposed Runway 32 at Logan International Airport
Prepared for the FAA by Jim Muldoon

Proposed Runway 14-32 at Logan is intended to provide an additional landing runway (r/w 32) during northwest wind conditions for smaller aircraft, principally regional turboprops, and to reduce airfield delays during those conditions. Recently updated forecasts indicate that the volume of regional turboprops will continue to reduce and that the volume of regional jet (RJ) operations will significantly increase. The question then is - "Will the 5000 ft length proposed for runway 14-32 be adequate for the RJ's included in the current Logan forecast?"

A paper prepared by SH&E tabulates the minimum landing distance for the three regional jets, which are forecast to operate at Logan in significant numbers:

Canadair CRJ-200	4,848 ft.
Embraer 145*	4,494 ft.
Fairchild 328 Jet	3,887 ft.

* For the purpose of this analysis I have added the Embraer 135 with a minimum landing distance of 4,200 ft.

A review of manufacturers published performance information, as well as the appropriate sections of the FAA Aircraft Certification and Air Carrier Operating Regulations, confirms the accuracy of these lengths for a maximum landing weight, on a "standard day", with a dry runway and zero wind. In actual operations these length requirements would be reduced or increased based upon prevailing operational conditions. Specifically, the length required would be reduced at landing weights less than maximum, with the likely presence of a headwind component and at temperatures less than 57 degrees. On the other hand, the lengths would increase with a wet runway (by 15%) and at higher ambient temperatures.

Given the expected range of operating conditions it is clear that the Fairchild RJ's would be able to plan on landing on a 5000 ft runway at Logan in accordance with the applicable regulations whenever the runway is in use, and that the Embraer 135 would encounter operating conditions that would prevent a legal landing on the runway very rarely. A similar range of operating conditions would, however, prevent the Canadair RJ and the Embraer 145 from legally dispatching against a 5000 ft. runway at Logan some significant portion of the time.

If the question were simply - Can these RJs legally conduct landings on the proposed runway? - a straightforward weather/performance analysis would probably establish a usability approaching 100% for both the Embraer 135 and Fairchild RJ's and a somewhat lower factor for the Embraer 145 and a lower still factor for the Canadair RJ.

In light of RJ operator requests for runway lengths greater than 5000 ft. at other airports and instances of non-use or a low volume of use of similar runways at other airports the more difficult question is - Will these RJ's operators accept a 5000 ft landing runway at Logan regardless of legal adequacy? Based upon the locations I was able to investigate, I believe that runway use estimates arrived at using "by-the-book" or "legal" requirements should be reduced somewhat.

Operator requests and supporting planning studies at airports, not presently receiving scheduled jet service, have indicated a need for runway lengths of up to 7,000 ft. to support RJ service. Typical of these locations are Sallisbury and Hagerstown Md., where recent analyses established a need for 6,000 to 7,000 ft. for the Embraer (ERJ) and Canadair (CRJ) respectively. These lengths are, however, predicated on takeoff requirements for a reasonable stage length and load factor. The landing lengths noted in the studies, although not critical to supporting the need for a specific runway extention, are, when adjusted back to sea level, essentially the same as those noted above.

Operator requests that at least a 7,000 ft. landing runway be provided during the construction staging at Cleveland Hopkins International Airport have also raised questions as to the suitability of a 5000 ft. landing runway for RJ's at Logan. Investigation indicated that the justification for a 7,000 ft. length at CLE was based on accommodating about 90% of all jet landings, which included virtually all narrow bodied air carrier jet aircraft. Again the landing distance requirements tabulated for the RJ's in the CLE fleet, when adjusted back to sea level were essentially the same as those noted above.

The reported lack of activity on the relatively new 5000 ft. runway at Philadelphia International also raises questions on the acceptability 5000 ft. at Logan. Investigation indicates that there are a number of factors which continue to limit the use of the runway for all commuters, not just the CRJ's operated at PHL by US Airways. Relatively long taxi distances, a land-and-hold short problem and the lack of Precision Runway Monitoring (PRM) equipment are all cited as factors that negatively affect the use of the runway. The hope, on the part of the consultants who planned and managed the construction of the runway, is that with the completion of the new commuter terminal and the commissioning of a PRM system late this spring the use of the runway will increase dramatically.

At Baltimore Washington International a 5000 ft commuter runway has been available since the late 1980's. Although US Airways operates CRJ's at BWI, the ongoing capacity study at the airport indicates no significant landing activity on the runway by RJ's. Conversations with ATC and airport operations people at BWI did not identify any mitigating factors affecting the use of the runway such as those noted at PHL, in fact non-jet commuter aircraft heavily use the runway when conditions permit. It appears clear that the CRJ operators are simply rejecting the runway because the length is, in their view, marginal.

Based on the specific experience at BWI, and the very small margin between the minimum calculated dry runway requirement and the length proposed at Logan, I do not believe that it is reasonable to anticipate any CRJ landings on runway 32 at Logan.

Recognizing that the wet runway requirements for both the Embraer 135 and 145 are just under (4830 ft.) and just over (5168 ft.) the proposed length, I do not believe that is reasonable to anticipate any ERJ landings on the runway in wet runway conditions.

On the other hand I believe that the margins for both ERJ's in dry conditions and for the Fairchild 328 both wet and dry are sufficient when combined with the operational advantages offered by the use of runway 32 to anticipate full use of the runway by those aircraft when conditions permit.

In summary, based upon the investigation outlined above, the following recommendations are offered for estimating RJ landings on runway 32 as an input for additional delay reduction and noise impact analyses:

- assume no landings by the Canadair CRJ-200
- analyze historical weather data to establish the percentage of time that landings would be conducted on runway 32 in "wet runway" conditions,
- allocate landings by both the Embraer 135 and 145 to other landing runways during those periods when runway 32 is a landing runway and wet runway conditions prevail.
- assume the balance of the RJ fleet will be capable and willing to land on runway 32.

JPM
12/29/00

Comparison of Delay Results for All Alternatives
Excerpted from the Draft EIS/EIR

Comparison of Delay Results for All Alternatives Excerpted from the Airside Draft EIS/EIR

Table 4.5-1
Total Hours of Delay by Alternative and Fleet Scenario

	Total Annual Delay Hours				
	1999 29M		2010 37.5M		2010 45M
Alternative	Low	High	Low	High	High
	Runway and Taxiway				
Alternative 1 - All Actions	111,400	126,500	171,900	168,600	236,600
Alternative 1A - All except Peak Period Pricing	114,450	148,700	183,000	249,600	377,500
Alternative 2 - All except Runway 14/32	136,000	155,900	224,000	208,300	328,200
Alternative 3 - No Build	145,600	166,900	233,900	213,200	339,100
Alternative 4 - No Action	157,500	216,600	260,900	363,400	595,700
Alternative 1 vs. Alternative 4	**46,100**	**90,100**	**89,000**	**194,800**	**359,100**
Alternative 1A vs. Alternative 4	**43,050**	**67,900**	**77,900**	**113,800**	**218,200**

Table 4.5-2
Percent Reduction in Annual Hours of Delay by Logan Improvement Concept and Fleet Scenario (Including Runway and Taxiway Delay)

	1999 29M		2010 37.5M		2010 45M
Improvement Concept	Low	High	Low	High	High
	Percent Delay Reduction vs. No Action				
Alternative 1 - All Actions	-29.3%	-41.6%	-34.1%	-53.6%	-60.3%
Alternative 1A - All except Peak Period Pricing	-27.3%	-31.3%	-29.9%	-31.3%	-36.6%
Alternative 2 - All except Runway 14/32	-13.7%	-28.0%	-14.1%	-42.7%	-44.9%
Alternative 3 - No Build	-7.6%	-22.9%	-10.3%	-41.3%	-43.1%
	Annual Hours of Delay				
Alternative 4 - No Action	157,500	216,600	260,900	363,400	595,700

Table 4.5-3
Hours of Delay by Alternative and Fleet Scenario

Alternative	1999 29M Low	1999 29M High	2010 37.5M Low	2010 37.5M High	2010 45M High
Runway Related Delay					
Alternative 1 - All Improvements	105,000	122,000	162,000	159,000	228,000
Alternative 1A - All except Peak Period Pricing	108,000	144,000	173,000	239,000	368,000
Alternative 2 - All except Runway 14/32	125,000	148,000	208,000	194,000	314,000
Alternative 3 - No Build	125,000	148,000	208,000	194,000	314,000
Alternative 4 - No Action	136,000	190,000	234,000	333,000	565,000
Delay Reduction					
Alternative 1 vs. Alternative 4	31,000	68,000	72,000	174,000	337,000
Alternative 1A vs. Alternative 4	28,000	46,000	61,000	94,000	197,000

Table 4.5-4
Benefit of Runway 14/32 in Northwest Wind Conditions

Scenario	Average VFR Delays (minutes per operation) Available Runway Configuration: 33L	33L and 32	Percent Delay Reduction
Baseline	181	14	(92%)
2010 37.5M Low	444	133	(70%)

Table 4.5-5
Benefit of Runway 14/32 in Southeast Wind Conditions

Scenario	Average VFR Delays (minutes per operation) Available Runway Configuration: 15R and 9	15R, 9 and 14	Percent Delay Reduction
Baseline	368	130	(65%)
2010 37.5M Low	431	189	(56%)

Table 4.5-6
Hours of Delay by Alternative and Fleet Scenario

Alternative	1999 29M Low	1999 29M High	2010 37.5M Low	2010 37.5M High	2010 45M High
			Taxiway Related Delay		
Alternative 1 - All Improvements	6,400	4,500	9,900	9,600	8,600
Alternative 1A - All except Peak Period Pricing	6,450	4,700	10,000	10,600	9,500
Alternative 2 - All except Runway 14/32	11,000	7,900	16,000	14,300	14,200
Alternative 3 - No Build	20,600	18,900	25,900	19,200	25,100
Alternative 4 - No Action	21,500	26,600	26,900	30,400	30,700
			Delay Reduction		
Alternative 1 vs. Alternative 4	**15,100**	**22,100**	**17,000**	**20,800**	**22,100**
Alternative 1A vs. Alternative 4	**15,050**	**21,900**	**16,900**	**19,800**	**21,200**

FIGURE 4.5-1: FORECAST ANNUAL HOURS OF DELAY BY WEATHER CONDITION – ALTERNATIVE 4 (NO ACTION)

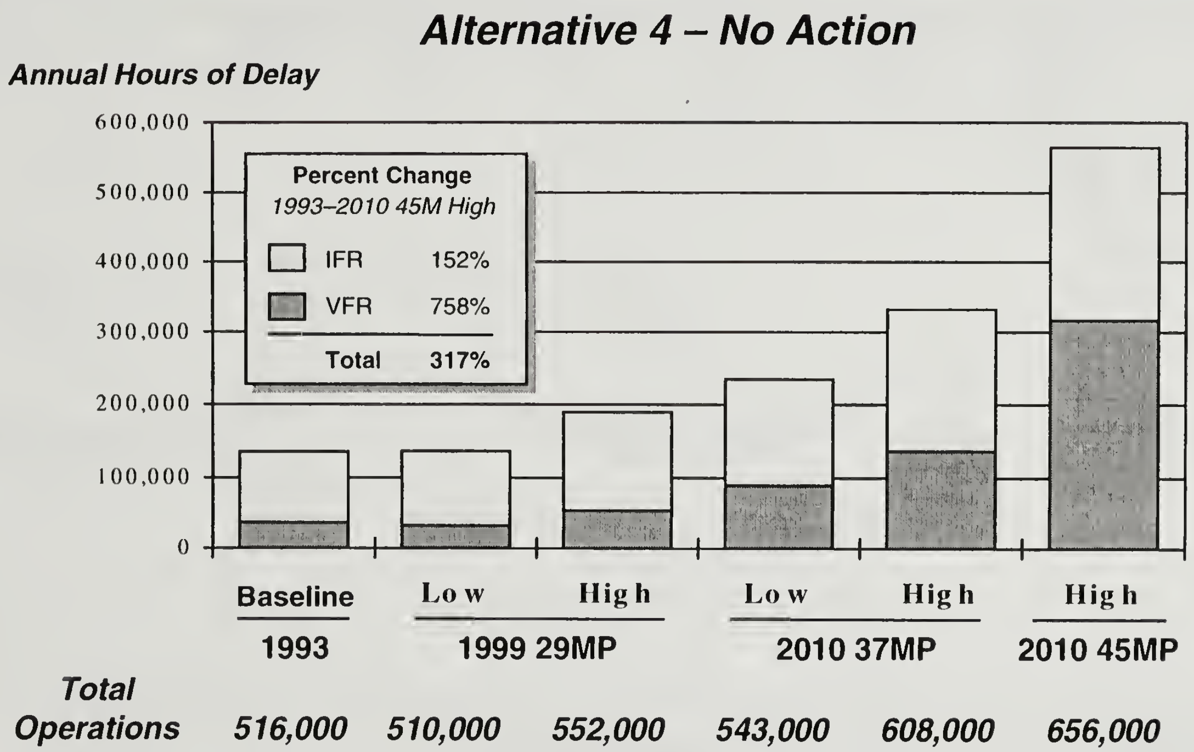


FIGURE 4.5-2: FORECAST ANNUAL HOURS OF DELAY BY WEATHER CONDITION – ALL ACTIONS VS. NO ACTION

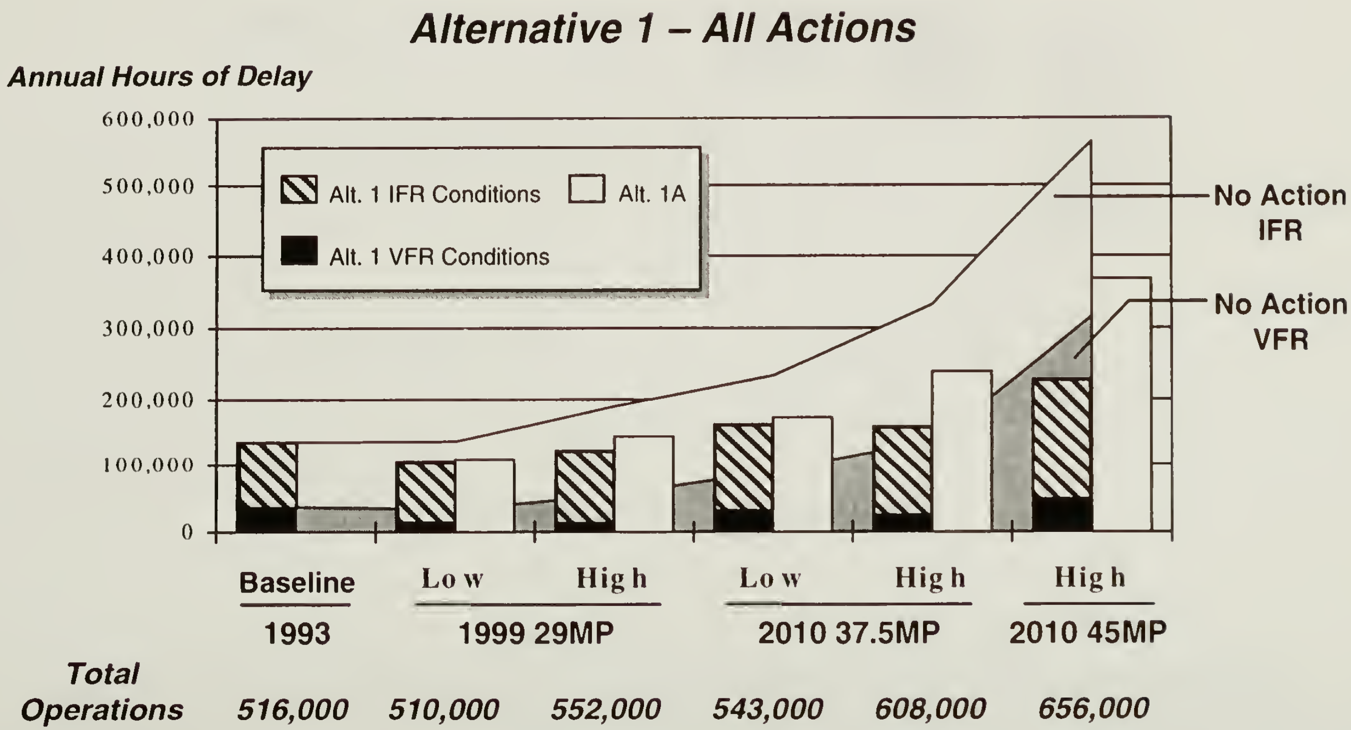
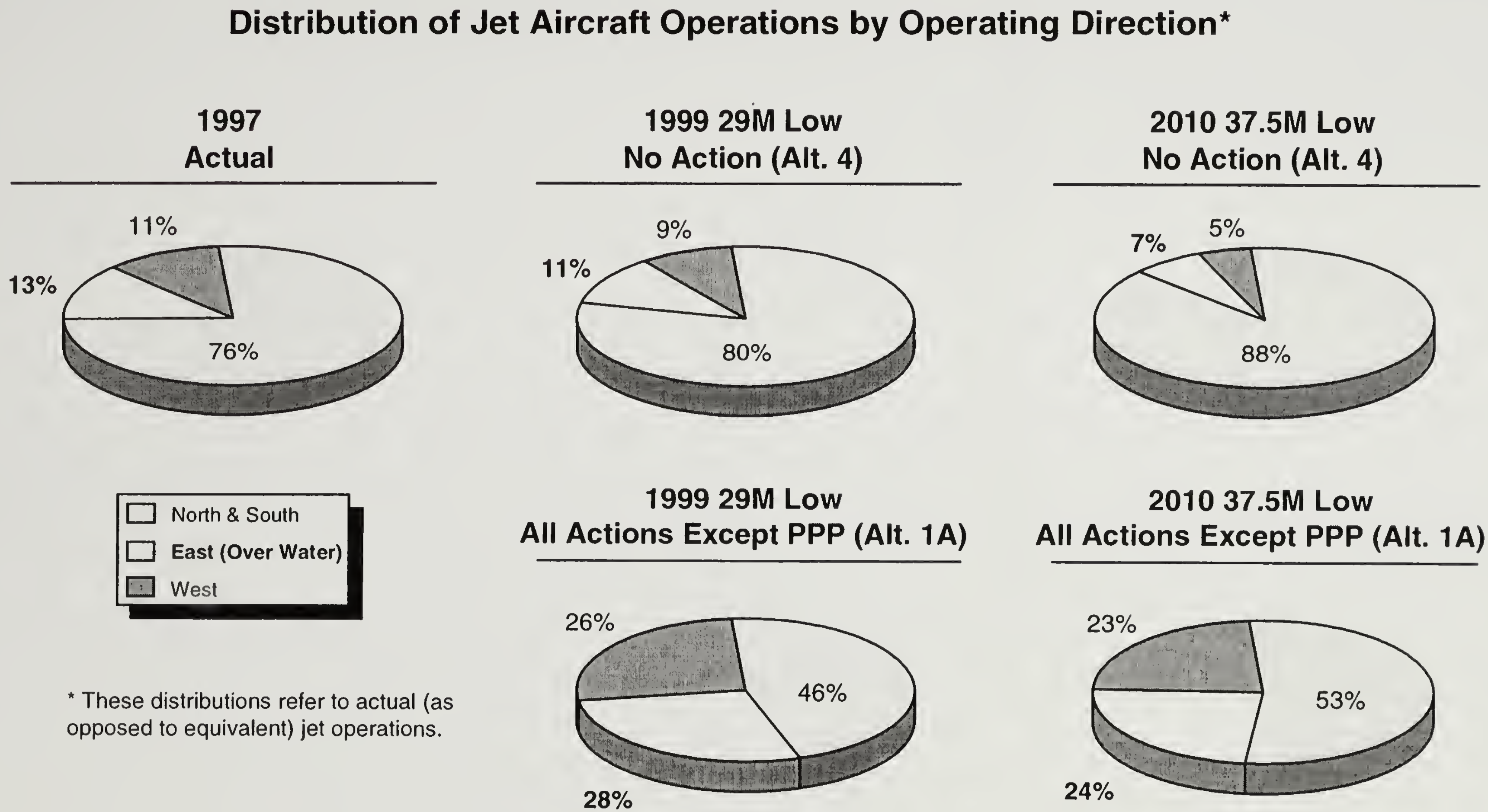


Figure 4.5-3 Jet Overflights by Operating Direction Are More Balanced with Runway 14/32 – ***Operations Over the Water Increase and Logan is Less Reliant on North/South Configurations***



* These distributions refer to actual (as opposed to equivalent) jet operations.

Total Annual and Total Jet Operations by Community,
Runway End & Alternative

Table 1
Total Annual Operations by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	**Procedure**	**1999**	**Alternative 4**	**Alternative 2/3**	**Alternative 1A**	**Alternative 1**
North						
Bayswater, Orient Heights,	A22	33,000	65,700	64,100	29,200	29,900
Constitution Beach,	D4	36,100	32,000	39,100	26,200	28,600
Wiinthrop and Revere	Subtotal	69,100	97,700	103,200	55,400	58,500
	A27	46,600	43,400	43,600	19,500	23,300
	D9	65,900	123,600	110,900	97,200	83,800
	Subtotal	112,500	167,000	154,500	116,700	107,100
East						
Boston Harbor, Hull	A33	41,700	26,300	25,000	76,400	72,200
	D15	9,500	6,200	5,600	7,700	7,900
	A32	-	-	-	41,900	43,400
	D14	-	-	-	900	1,200
	Subtotal	51,200	32,500	30,600	126,900	124,700
South						
South Boston, Boston Harbor	D22	87,600	108,100	106,700	42,200	46,300
South Boston, Dorchester, Quincy	Subtotal	87,600	108,100	106,700	42,200	46,300
Milton, Braintree, etc.	A4	86,700	155,500	149,600	121,700	109,300
	Subtotal	86,700	155,500	149,600	121,700	109,300
West						
South Bos (D Street), South End,	D27	30,600	14,800	14,000	72,100	69,600
Roxbury, Jamaica Plain	A9	-	200	200	400	500
Chelsea, Eagle Hill	Subtotal	30,600	15,000	14,200	72,500	70,100
	A15	39,300	1,600	1,200	3,600	5,000
	D33	17,700	7,900	7,400	46,200	46,100
	Subtotal	57,000	9,500	8,600	49,800	51,100
North and South		355,900	528,300	514,000	336,000	321,200
East (Over-water)		51,200	32,500	30,600	126,900	124,700
West		87,600	24,500	22,800	122,300	121,200
Total		494,700	585,300	567,400	585,200	567,100
North and South		71.9%	90.3%	90.6%	57.4%	56.6%
East (Over-water)		10.3%	5.6%	5.4%	21.7%	22.0%
West		17.7%	4.2%	4.0%	20.9%	21.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Table 2
Total Annual Jet Operations by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	Procedure	1999	Alternative 4	Alternative 2/3	Alternative 1A	Alternative 1
North						
Bayswater, Orient Heights,	A22	14,700	51,000	50,400	23,500	24,000
Constitution Beach, Wiinthrop	D4	12,200	16,800	24,100	13,500	17,700
and Revere	Subtotal	26,900	67,800	74,500	37,000	41,700
Winthrop	A27	41,800	43,200	43,500	19,300	23,000
	D9	47,400	117,500	106,600	93,300	80,500
	Subtotal	89,200	160,700	150,100	112,600	103,500
East						
Boston Harbor, Hull	A33	31,300	22,700	21,800	75,300	71,200
	D15	7,800	5,500	4,900	6,900	7,100
	A32	-	-	-	26,200	28,800
	D14	-	-	-	400	600
	Subtotal	39,100	28,200	26,700	108,800	107,700
South						
South Boston, Boston Harbor	D22	52,700	93,500	93,000	36,500	40,400
South Boston, Dorchester, Quincy	Subtotal	52,700	93,500	93,000	36,500	40,400
Milton, Braintree, etc.	A4	60,100	134,400	130,300	105,200	95,300
	Subtotal	60,100	134,400	130,300	105,200	95,300
West						
South Boston (D Street), South End,	D27	22,600	14,500	13,700	71,800	69,400
Roxbury, Jamaica Plain	A9	-	100	100	100	200
	Subtotal	22,600	14,600	13,800	71,900	69,600
Chelsea, Eagle Hill	A15	3,000	1,400	1,100	3,300	4,600
	D33	8,300	5,100	4,900	30,500	31,500
	Subtotal	11,300	6,500	6,000	33,800	36,100
North and South		202,000	456,400	447,900	291,300	280,900
East (Overwater)		39,100	28,200	26,700	108,800	107,700
West		33,900	21,100	19,800	105,700	105,700
Total		275,000	505,700	494,400	505,800	494,300
North and South		73.5%	90.3%	90.6%	57.6%	56.8%
East (Overwater)		14.2%	5.6%	5.4%	21.5%	21.8%
West		12.3%	4.2%	4.0%	20.9%	21.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Table 3
Total Annual Jet Operations Excluding RJs by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	**Procedure**	**1999[a]**	**Alternative 4**	**Alternative 2/3**	**Alternative 1A**	**Alternative 1**
North						
Bayswater, Orient Heights,	A22		32,200	32,400	14,900	15,500
Constitution Beach, Wiinthrop	D4		14,800	21,500	11,900	15,900
and Revere	Subtotal		47,000	54,000	26,800	31,400
Winthrop	A27		27,600	28,000	12,500	15,600
	D9		70,000	62,600	55,700	47,400
	Subtotal		97,600	90,600	68,200	63,000
East						
Boston Harbor, Hull	A33		14,400	14,100	59,300	59,400
	D15		3,900	3,200	4,700	4,800
	A32		-	-	4,900	4,400
	D14		-	-	200	200
	Subtotal		18,300	17,400	69,000	68,700
South						
South Boston, Boston Harbor	D22		59,500	60,100	23,200	26,100
South Boston, Dorchester, Quincy,	Subtotal		59,500	60,100	23,200	26,100
Milton, Braintree, etc.	A4		85,400	84,000	66,900	61,500
	Subtotal		85,400	84,000	66,900	61,500
West						
South Boston (D Street), South End,	D27		8,700	8,300	45,400	44,700
Roxbury, Jamaica Plain	A9		100	100	100	200
	Subtotal		8,800	8,400	45,400	44,900
Chelsea, Eagle Hill	A15		900	700	2,100	2,900
	D33		3,800	3,700	19,600	20,400
	Subtotal		4,700	4,400	21,700	23,300
North and South			289,500	288,700	185,100	182,000
East (Over-water)			18,300	17,400	69,000	68,700
West			13,500	12,800	67,100	68,200
Total		263,900	321,300	318,900	321,200	318,900
North and South			90.1%	90.5%	57.6%	57.1%
East (Over-water)			5.7%	5.5%	21.5%	21.5%
West			4.2%	4.0%	20.9%	21.4%
Total		0.0%	100.0%	100.0%	100.0%	100.0%

a Runway distribution data on regional jets in 1999 is not available.

Table 4
Total Annual Equivalent Jet Operations by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	**Procedure**	**1999**	**Alternative 4**	**Alternative 2/3**	**Alternative 1A**	**Alternative 1**
North						
Bayswater, Orient Heights,	A22	56,000	177,600	161,000	119,800	100100
Constitution Beach, Wiinthrop	D4	19,600	37,000	48,400	33,600	39000
and Revere	Subtotal	75,600	214,600	209,400	153,400	139,100
Winthrop	A27	85,300	81,700	80,300	44,000	51,300
	D9	78,800	256,100	225,300	183,300	163,700
	Subtotal	164,100	337,800	305,600	227,300	215,000
East						
Boston Harbor, Hull	A33	108,600	103,300	97,500	179,000	167,900
	D15	35,300	43,600	45,400	51,000	54,200
	A32	-	-	-	47,200	52,500
	D14	-	-	-	1,200	1,500
	Subtotal	143,900	146,900	142,900	278,400	276,100
South						
South Boston, Boston Harbor	D22	102,000	256,400	238,200	144,100	130,600
South Boston, Dorchester, Quincy,	Subtotal	102,000	256,400	238,200	144,100	130,600
Milton, Braintree, etc.	A4	118,000	297,100	276,000	210,200	194,400
	Subtotal	118,000	297,100	276,000	210,200	194,400
West						
South Boston (D Street), South End,	D27	49,500	46,600	40,500	126,000	118,100
Roxbury, Jamaica Plain	A9	-	600	500	600	700
	Subtotal	49,500	47,200	41,000	126,600	118,800
Chelsea, Eagle Hill	A15	7,900	4,100	4,000	10,200	12,600
	D33	17,200	19,700	18,500	68,200	69,500
	Subtotal	25,100	23,800	22,500	78,400	82,100
North and South		459,700	1,105,900	1,029,200	735,000	679,100
East (Over-water)		143,900	146,900	142,900	278,400	276,100
West		74,600	71,000	63,500	205,000	200,900
Total		678,200	1,323,800	1,235,600	1,218,400	1,156,100
North and South		67.8%	83.5%	83.3%	60.3%	58.7%
East (Over-water)		21.2%	11.1%	11.6%	22.8%	23.9%
West		11.0%	5.4%	5.1%	16.8%	17.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Table 5
Total Annual Daytime (7AM-10PM) Jet Operations by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	**Procedure**	**1999**	**Alternative 4**	**Alternative 2/3**	**Alternative 1A**	**Alternative 1**
North						
Bayswater, Orient Heights,	A22	10,100	36,900	38,100	12,800	15,500
Constitution Beach, Wiinthrop	D4	11,400	14,600	21,400	11,300	15,300
and Revere	Subtotal	21,500	51,500	59,500	24,100	30,800
Winthrop	A27	37,000	38,900	39,400	16,600	19,900
	D9	43,900	102,100	93,400	83,300	71,300
	Subtotal	80,900	141,000	132,800	99,900	91,200
East						
Boston Harbor, Hull	A33	22,700	13,700	13,400	63,800	60,500
	D15	4,700	1,300	400	2,000	1,900
	A32	-	-	-	23,900	26,200
	D14	-	-	-	300	500
	Subtotal	27,400	15,000	13,800	90,000	89,100
South						
South Boston, Boston Harbor	D22	47,200	75,400	76,900	24,500	30,400
South Boston, Dorchester, Quincy,	Subtotal	47,200	75,400	76,900	24,500	30,400
Milton, Braintree, etc.	A4	53,700	116,300	114,100	93,500	84,300
	Subtotal	53,700	116,300	114,100	93,500	84,300
West						
South Boston (D Street), South End,	D27	19,600	10,900	10,700	65,800	64,000
Roxbury, Jamaica Plain	A9	-	-	100	-	100
	Subtotal	19,600	10,900	10,800	65,800	64,100
Chelsea, Eagle Hill	A15	2,500	1,100	800	2,500	3,700
	D33	7,300	3,500	3,400	26,300	27,300
	Subtotal	9,800	4,600	4,200	28,800	31,000
North and South		188,300	420,400	415,600	265,700	257,700
East (Over-water)		27,400	15,000	13,800	90,000	89,100
West		29,400	15,500	15,000	94,600	95,100
Total		245,100	450,900	444,400	450,300	441,900
North and South		76.8%	93.2%	93.5%	59.0%	58.3%
East (Over-water)		11.2%	3.3%	3.1%	20.0%	20.2%
West		12.0%	3.4%	3.4%	21.0%	21.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Table 6
Total Annual Nighttime (10PM-7AM) Jet Operations by Community, Runway End and Alternative

			2015 High RJ Fleet			
Community	**Procedure**	**1999**	**Alternative 4**	**Alternative 2/3**	**Alternative 1A**	**Alternative 1**
North						
Bayswater, Orient Heights,	A22	4,600	14,100	12,300	10,700	8,500
Constitution Beach, Wiinthrop	D4	800	2,200	2,700	2,200	2,400
and Revere	Subtotal	5,400	16,300	15,000	12,900	10,900
Winthrop	A27	4,800	4,300	4,100	2,700	3,100
	D9	3,500	15,400	13,200	10,000	9,200
	Subtotal	8,300	19,700	17,300	12,700	12,300
East						
Boston Harbor, Hull	A33	8,600	9,000	8,400	11,500	10,700
	D15	3,100	4,200	4,500	4,900	5,200
	A32	-	-	-	2,300	2,600
	D14	-	-	-	100	100
	Subtotal	11,700	13,200	12,900	18,800	18,600
South						
South Boston, Boston Harbor	D22	5,500	18,100	16,100	12,000	10,000
South Boston, Dorchester, Quincy,	Subtotal	5,500	18,100	16,100	12,000	10,000
Milton, Braintree, etc.	A4	6,400	18,100	16,200	11,700	11,000
	Subtotal	6,400	18,100	16,200	11,700	11,000
West						
South Boston (D Street), South End,	D27	3,000	3,600	3,000	6,000	5,400
Roxbury, Jamaica Plain	A9		100	-	100	100
	Subtotal	3,000	3,700	3,000	6,100	5,500
Chelsea, Eagle Hill	A15	500	300	300	800	900
	D33	1,000	1,600	1,500	4,200	4,200
	Subtotal	1,500	1,900	1,800	5,000	5,100
North and South		13,700	36,000	32,300	25,600	23,200
East (Over-water)		11,700	13,200	12,900	18,800	18,600
West		4,500	5,600	4,800	11,100	10,600
Total		29,900	54,800	50,000	55,500	52,400
North and South		45.8%	65.7%	64.6%	46.1%	44.3%
East (Over-water)		39.1%	24.1%	25.8%	33.9%	35.5%
West		15.1%	10.2%	9.6%	20.0%	20.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Appendix D
Northwest Wind Runway Use Restriction

D

Evaluation of Proposed Northwest Wind Restriction on Unidirectional Runway 14/32

One of the issues raised in the FAA Panel Process was the possibility of restricting the availability and use of Runway 32 to Northwest wind conditions only. This proposal was designed to limit the increase in the number and proportion of jet departures on Runway 27 that was predicted to occur with construction of the new runway. Runway 27 is the principal departure runway used in combination with arrivals on Runways 33 and 32 in the new three-runway configuration that would become available with construction of unidirectional Runway 14/32. With the proposed new runway, Logan would have three-runway configurations available in three distinct operating directions: to the north using Runways 4L/4R and 9, to the south using Runways 22L/22R and 27, and to the northwest using Runways 33/32 and 27.[1]

Currently, when wind conditions require air traffic control to route aircraft on a northwesterly heading, available airfield capacity declines sharply from Logan's normal three-runway capacity down to the capacity of two, and sometimes just one runway. As described throughout this report, the construction of Runway 14/32 would prevent this substantial decline in airfield capacity, and the resulting aircraft delay that now occurs under these conditions.

The increased usage of Runway 27 projected in the airfield simulation modeling reflects the availability of this new three-runway configuration in the northwest direction. This configuration would not only allow controllers to nearly eliminate northwest wind delays at Logan, but would also enable air traffic control to more evenly distribute aircraft overflights across three different operating directions during periods of high demand. As discussed in Chapter 4, this flexibility leads to a significant improvement in the ability of air traffic control to achieve the Preferential Runway Assignment System (PRAS) goals and provides relief to residents of communities impacted by use of the existing north and south runway configurations.

1 *Construction of the proposed new runway would also create a fourth three-runway configuration—Runways 15/14/ and 9—in a southeast alignment. However, this configuration would have limited arrival capacity.*

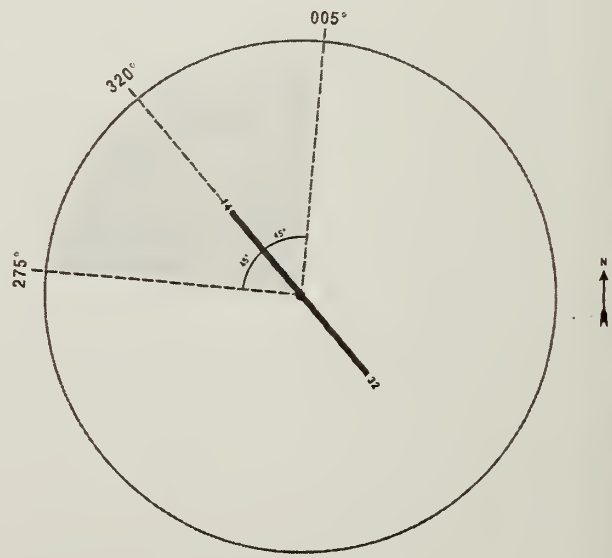
Utilization of the new three-runway configuration (33/32 and 27) to improve PRAS achievement results in a predicted increase in the percent of jets using Runway 27 for departure, above the level that would occur if the configuration was used only to reduce delays resulting from northwest winds. Numerous public comments received on the Draft EIS/EIR objected to a "tripling of overflights" off Runway 27 that was forecast to occur with the construction of Runway 14/32.

For this Supplemental Draft EIS, analysis was performed to determine how restricting the use of Runway 32 to northwest wind conditions would impact the delay reduction benefits produced by the runway as well as the associated utilization of Runway 27 for jet departures. Other changes in runway utilization were identified, as were the implications of the restriction on PRAS achievement and noise exposure patterns. In framing the analysis, rules were developed to identify the wind direction and wind speed under which the Runway 32 would be available for use. These parameters are described below.

Wind Direction

In the wind restriction scenario, Runway 32 was made available for arriving aircraft only when the wind direction was within the 90-degree quadrant between 275° and 005° (i.e., 45 degrees on either side of the 320° runway heading). The wind direction criterion is displayed below in Figure 1. When the wind direction was not within the defined quadrant, Runway 32 was not available for use.

Figure 1.
Quadrant Restriction



Wind Speed

Alternative wind speed criteria of 5, 10, 15, 20, and 25 knots were used to evaluate the proposed restriction on Runway 32. Under the 5 knot scenario, Runway 32 was available for arrivals when wind direction was between 275° and 005°, and wind speed with gusts was 5 knots or greater. As the wind speed threshold was progressively increased from 5 knots to 25 knots, the percent of time in which the runway was available for use declines. For context, FAA Order 7110.65 Air Traffic Control recommends use of the runway most nearly aligned with the wind, when wind speed is 5 knots or more, unless use of another runway would be operationally advantageous or is requested by the pilot.

Weather

Hour-by-hour Boston weather data for the three year period between 1997 and 1999, as reported by the FAA in the CODAS weather database, was used in performing the analysis of the potential wind restriction. This is the same weather database that was used in evaluating all of the proposed airfield improvements for the 2015 RJ Fleet scenario.

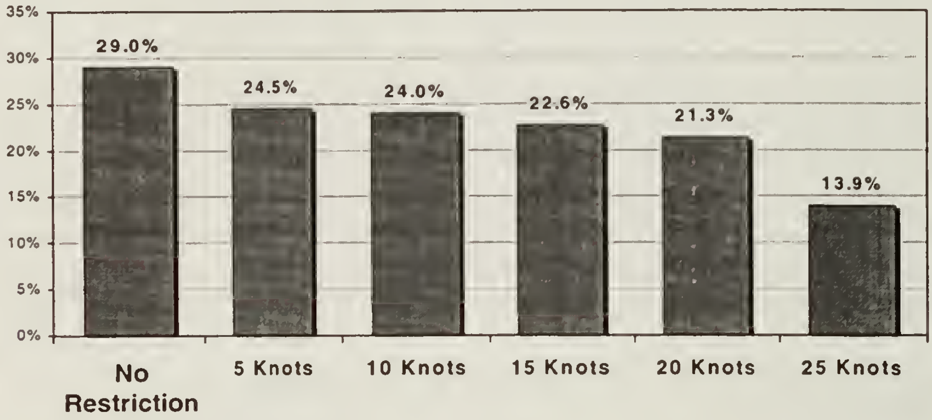
Fleet Scenario

The proposed wind restriction was evaluated based on the 2015 37.5 million passenger RJ Fleet scenario. This fleet represents the third alternative fleet scenario designed to accommodate 37.5 million annual passengers, along with the 37.5 million High Fleet and the 37.5 million Low Fleet. The 2015 RJ fleet has annual operations of approximately 584,000—between the 37.5 High and Low Fleet scenarios—and is characterized by a substantially higher volume of regional jet aircraft and far fewer non-jet aircraft than is present in either of the previously evaluated 37.5 million fleets.

Delay Reduction Impacts

Without any restriction on the use of Runway 14/32, the Preferred Alternative 1A produced a 29 percent reduction in forecast annual delay hours at Logan. Figure 2, below shows the percent reduction in annual Logan delays that could be achieved with various restrictions on the use of the proposed runway.

Figure 2.
Delay Reduction Benefits of Various Wind Restrictions
Percent Delay Reduction: Preferred Alternative vs. No Action, 2015 RJ Fleet



With a 5-knot northwest wind restriction, the delay benefits of Runway 14/32 are somewhat reduced, from 29 percent in the unrestricted scenario down to 25 percent at 5 knots or greater. With a 10-knot northwest wind restriction, Runway 14/32 reduces annual delays by 24 percent. Allowing use of Runway 32 only in northwest winds of 25 knots or greater, the delay reduction benefits are cut by more than half, from 29 percent (unrestricted) down to just 14 percent.

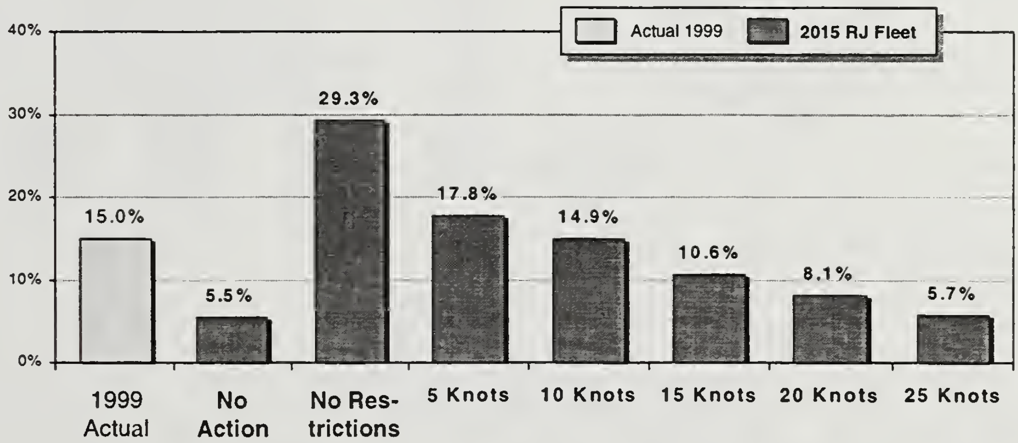
Clearly, the greatest delay reduction benefits are associated with unrestricted availability of the proposed runway. As the circumstances under which air traffic controllers are permitted to use the runway become increasingly limited, the delay reduction benefits associated with the runway are reduced.

Changes in Runway Utilization Patterns

Limiting the use of Runway 32 to northwest wind conditions has impacts on the predicted patterns of runway utilization at Logan. Figure 3 shows that, as intended, the restriction does limit the increase in jet departures using Runway 27. With an unrestricted runway, the use of Runway 27 is projected to increase from 6 percent of jet departures under the No Action scenario up to 29 percent with the Preferred Alternative. With a 5-knot northwest wind restriction, the use of Runway 27 is projected to increase to only 18 percent of jet departures, compared to the 30 percent use in the

unrestricted case. With a 10-knot restriction, the use of Runway 27 is only 15 percent. With a 25 knot restriction, Runway 27 use matches the No Action value of 6 percent. For comparison, in 1999 Runway 27 was used by 15 percent of Logan's jet departures.

Figure 3.
Runway 27 Jet Departures as a Percent of Total



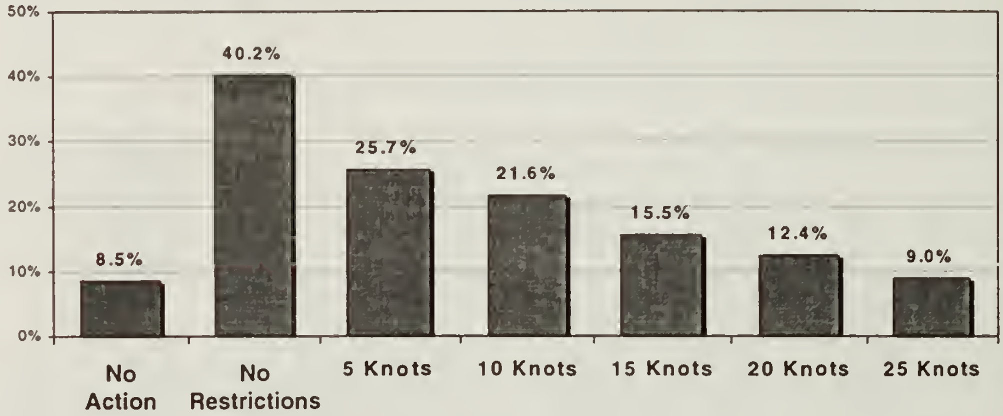
However, restricting the use of Runway 32 has three undesirable consequences:

- The restriction would limit the ability of FAA controllers to increase use of over-the-water flight paths.
- The restriction would increase activity on the north and south runways relative to the unrestricted Preferred Alternative. The north and south runways are already the most heavily utilized runways at Logan.
- The restriction would hamper the ability of air traffic controllers to achieve PRAS goals, including both the annual runway use targets and the short-term goals to limit dwell and persistence.

Over-the-Water Arrivals

The availability of Runway 14/32 and the new three-runway configuration (33/32/27) allows controllers to maximize the use of over-the-water flight paths at Logan. In the 2015 RJ Fleet for example, jet arrivals on Runways 33 and 32 would increase from approximately 22,000 per year (or 9 percent of jet arrivals) under the No Action scenario up to more than 100,000 annual arrivals (or 40 percent of total) with an unrestricted runway.

Figure 4.
Over-Water Jet Arrivals as a Percent of Total

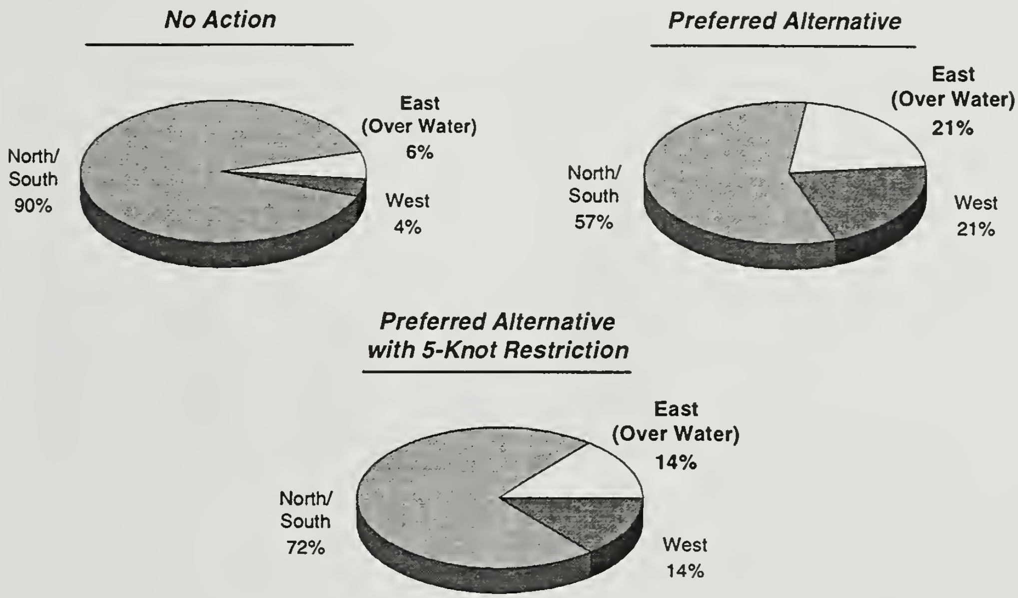


As shown in Figure 4, applying a northwest wind restriction to the use of Runway 32 limits the ability to route more inbound flights over the water. With a 5-knot northwest wind restriction on Runway 32, over-the-water jet arrivals would decline by more than one third to approximately 65,000 annual flights, or 26 percent of total. As the northwest wind restriction is tightened to require higher wind speeds, there is a further loss in the ability to route inbound flights on an over-water approach. With a 25-knot wind restriction on the use of Runway 32, only 23,000 annual jets would arrive on over-water flight paths to Runways 33 or 32, barely above the number of over-water jet arrivals estimated without the new runway under the No Action scenario.

Increased Use of North/South Configurations

While a northwest wind restriction on the use of Runway 32 would lower the utilization of Runways 33, 32 and 27, the restriction would produce a corresponding increase in usage of the north and south runways at Logan. A major advantage of the (unrestricted) runway was that it could provide relief to communities impacted by jet activity on the north/south runway configurations (4R/L, 22R/L, 27 arrivals, 9 departures) that receive the majority of Logan's jet flights. As shown in Figure 5, construction of Runway 14/32 and its unrestricted availability could reduce utilization of these north/south configurations from 90 percent (2015 RJ Fleet) to 57 percent.

Figure 5.
Jet Overflights by Direction – *2015 RJ Fleet*



If use of Runway 32 were restricted to northwest wind conditions, much of this beneficial reduction in north/south runway utilization would be sacrificed. At a 5-knot restriction, use of the north/south runways would reach 72 percent, while at a 15-knot restriction, north/south runway utilization is estimated at 83 percent.

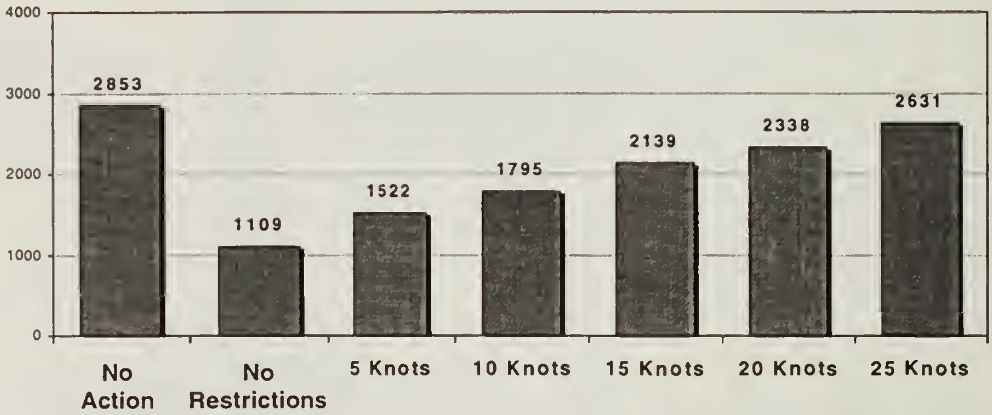
PRAS Performance

By providing a third three-runway configuration at Logan, the new runway would enable controllers to more evenly distribute flight activity across different runways, and thereby enable a significant improvement in the ability to achieve PRAS goals. The PRAS Performance Index (PPI), described previously in Section 4.3.4.7 of this Supplemental Draft, measures the extent to which air traffic controllers are able to achieve the annual runway utilization goals. The more closely actual runway utilization mirrors the PRAS goals, the lower the resulting PPI value.

Figure 6 compares the PRAS Performance Index values for the 2015 RJ Fleet scenario under the No Action scenario, with an unrestricted Runway 14/32, and with various levels of northwest wind restrictions. As illustrated in the graphic, the unrestricted availability of the proposed runway would permit a 61 percent improvement in

achievement of the annual PRAS runway use goals—from an index value of 2853 (No Action) down to 1109 (Preferred Alternative).

Figure 6.
PRAS Performance Index – *2015 RJ Fleet Scenario*



Placing a northwest wind restriction on Runway 32 limits the potential improvement in PRAS performance. At a 5-knot wind restriction, the PRAS index climbs to 1522, sacrificing 23 percent of the improvement permitted with an unrestricted runway. As the wind speed restriction is progressively increased, the potential gain in PRAS performance is further diluted.

In addition to the long-term runway use goals, PRAS also has short-term goals for dwell and persistence, described in Section 4.3.2.2 of this Supplemental Draft. As with the long-term goals, the northwest wind restriction limits the ability of air traffic controllers to improve short-term PRAS performance. Annual dwell exceedance improves from 2,107 hours under the No Action scenario to 1,407 hours with the Preferred Alternative. A 5-knot restriction, allows dwell exceedance to climb back to 1,851 hours, and a 15-knot restriction increases dwell to 1,972 hours. The northwest wind restrictions have a similar impact on persistence exceedance.

Noise Impacted Population

Because restricting the use of Runway 32 would change runway utilization at Logan, the restriction would also impact the airport's noise contour and the resulting noise exposure patterns. To illustrate these changes, noise impacts with a 5-knot northwest wind restriction were compared to projected noise exposure patterns occurring with an unrestricted runway. As shown in Figure 7, restricting the use of Runway 32 would cause more people to experience noise exposure levels of greater than 70 DNL. This increase is concentrated in the communities of Revere and Winthrop, and is the result of greater use of the north/south runway configurations that occurs when use of 33/32/27 is limited by the 5-knot restriction.

Figure 7.
Population Impacts of a 5-Knot Northwest Wind Restriction – *2015 RJ Fleet*

		Preferred Alt.		
Area Impacted	**No Action**	**Unrestricted**	**5-Knot Restriction**	**Change**
DNL 75 and above	222	58	58	-
DNL 70 and above	3,700	2,267	3,144	877
DNL 65 and above	11,493	11,857	11,671	(186)
DNL 60 and above	36,857	50,048	45,582	(4,466)

At the same time, the population experiencing noise exposure above 65 DNL declines by two percent with the northwest wind restriction. This decline takes place because of the lowered utilization of Runway 33 for departures which reduces the number of people in East Boston (Eagle Hill) exposed to noise levels of 65 DNL or above.

Complete population counts by community and noise exposure level are shown in Figure 8.

Figure 8.
Detailed Population Impacts of a 5-Knot Northwest Wind Restriction

		Preferred Alternative		
Day-Night Sound Level	No Action	Unrestricted	5-Knot Restriction	Change
Chelsea				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	-	392	454	62
DNL 60 and above	1,601	8,117	7,206	(911)
Everett				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	-	-	-	-
DNL 60 and above	-	-	-	-
E. Boston - Eagle Hill				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	120	3,133	2,079	(1,054)
DNL 60 and above	3,956	11,247	8,489	(2,758)
E. Boston - Orient Hts/Bayswater St.				
DNL 75 and above	58	58	58	-
DNL 70 and above	355	239	239	-
DNL 65 and above	1,135	606	606	-
DNL 60 and above	4,213	3,287	3,740	453
Other East Boston				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	986	649	766	117
DNL 60 and above	3,940	4,091	4,091	-
Total East Boston				
DNL 75 and above	58	58	58	-
DNL 70 and above	355	239	239	-
DNL 65 and above	2,241	4,388	3,451	(937)
DNL 60 and above	12,109	18,625	16,320	(2,305)
Long Island				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	-	-	-	-
DNL 60 and above	-	-	-	-
Revere				
DNL 75 and above	-	-	-	-
DNL 70 and above	2,260	1,389	2,141	752
DNL 65 and above	3,854	3,428	3,428	-
DNL 60 and above	7,901	6,052	6,898	846
South Boston				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	1,080	765	872	107
DNL 60 and above	3,479	6,950	4,275	(2,675)
Boston (Other)				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	-	-	-	-
DNL 60 and above	674	482	621	139

- continued -

Figure 8 / continued
Detailed Population Impacts of a 5-Knot Northwest Wind Restriction

		Preferred Alternative		
Day-Night Sound Level	No Action	Unrestricted	5-Knot Restriction	Change
Winthrop - Point Shirley				
DNL 75 and above	164	-	-	-
DNL 70 and above	697	417	482	65
DNL 65 and above	1,542	1,305	1,452	147
DNL 60 and above	2,527	2,291	2,401	110
Winthrop - Court Road				
DNL 75 and above	-	-	-	-
DNL 70 and above	388	222	282	60
DNL 65 and above	1,661	1,128	1,234	106
DNL 60 and above	3,387	3,387	3,387	-
Rest of Winthrop				
DNL 75 and above	-	-	-	-
DNL 70 and above	-	-	-	-
DNL 65 and above	1,115	451	780	329
DNL 60 and above	5,179	4,144	4,474	330
Total Winthrop				
DNL 75 and above	164	-	-	-
DNL 70 and above	1,085	639	764	125
DNL 65 and above	4,318	2,884	3,466	582
DNL 60 and above	11,093	9,822	10,262	440
Total Population summary				
DNL 75 and above	222	58	58	-
DNL 70 and above	3,700	2,267	3,144	877
DNL 65 and above	11,493	11,857	11,671	(186)
DNL 60 and above	36,857	50,048	45,582	(4,466)

Findings

In summary, the proposed northwest wind restriction on Runway 32 would have the following consequences:

1. A northwest wind restriction would sacrifice a portion of the delay reduction benefits that could be realized through unrestricted usage of the runway. Even at the least severe 5 knot wind restriction, Logan would experience 17,000 more hours of annual aircraft delay under the 2015 RJ Fleet scenario than it would with an unrestricted runway. As the wind speed criteria is increased, further limiting the circumstances in which the runway could be used, the delay benefits of the runway are progressively eroded.

2. The proposed restriction does limit the increase in jet departures off Runway 27 that results from its use in combination with Runways 33 and 32. With a 5-knot northwest wind restriction, usage of Runway 27 declines from 29 percent to 18 percent of total Logan jet departures. The utilization of Runway 27 for departures drops further as the wind speed criteria on Runway 32 is increased.

3. However, the decreased usage of Runway 27 corresponds with other, less desirable changes in runway utilization at Logan. Restrictions on the use of Runway 32 would limit the number of aircraft using over-the-water routings to Runways 32 and 33. The proposed restriction also sacrifices potential relief to residents of communities impacted by the prevailing north/south runway configurations at Logan.

4. Restricting the use of Runway 32 would reduce the ability of air traffic controllers to achieve the PRAS goals, including the annual runway use goals and the short-term goals designed to limit dwell and persistence of overflights impacting individual communities.

5. A wind restriction on the use of Runway 32 would increase the number of people exposed to the highest noise levels above 70 DNL (compared to an unrestricted runway). However, the restriction would at the same time lower the population exposed to noise levels greater than 65 DNL. These impacts occur due to changes in runway utilization patterns that result from restricting the use of proposed Runway 14/32.

Appendix E
Noise

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

Mr. Ken Eldred
Ken Eldred Engineering
Meadow Cove
P.O. Box 501
East Boothbay, ME 04544

Dear Ken:

This is in response to your letter dated March 14, requesting approval to modify the Integrated Noise Model (INM) 5.0 aircraft profiles for use in the Massport Logan Airside Improvements Planning Project Environmental Impact Statement (EIS) and Report (EIR). These modifications will improve the agreement between H-;M results and measured noise data obtained from the Boston Logan International Airport (BOS) permanent noise monitoring system.

You are hereby authorized to modify aircraft takeoff profiles by adjusting thrust values at the start of the takeoff roll point and at the liftoff point to increase the SEL during ground roll by 6 dB. You are also authorized to modify aircraft landing profiles by adjusting thrust values at the 1,000 foot altitude point and at the touchdown point to increase the SEL during the final phase of landing by 4 dB. These changes are warranted given the differences due to excess ground attenuation over water at BOS versus what is modeled in INM over grass covered ground. Additionally, the modifications are warranted because the comparisons were made using the large amount of data obtained from the BOS permanent noise monitoring system.

Please understand that this approval applies only to the modification of takeoff profiles at ground roll and of approach profiles during final phase of landing as part of this BOS EIS and EIR. Any additional projects or non-standard]NM input for BOS will require separate approval. If you have any questions or need additional assistance, please contact Donna Warren by phone at (202) 267-3571, by FAX at (202) 267-5594, or by EMAIL at donna-warffen@mail.hq.faa.gov.

Sincerely,

Jake A. Plante
Manager, Analysis and Evaluation
Branch, AEE-120
Office of Environment and Energy

MLD\06599\

Ken
Eldred
Engineering

TELEPHONE and FAX 207 633-6414

MEADOW COVE BOX 501 EAST BOOTHBAY • MAINE • 04544 * USA

March 14, 1996

Mr. John M. Gulding
Office of Environment and Energy
FAA-AEE-120
Federal Aviation Administration
800 Independence Ave, SW
Washington, DC 20591

Subject: **Request to Modify Profiles in E'~M 5.0 to Improve Agreement Between INM Calculated and Measured Values of DNL at Boston Logan International Airport for Use in the Massport Logan Airside Improvements Planning Project EIS/EIR**

Dear Mr. Gulding,

This letter contains a request to the FAA to approve adjustments to the Prof pts.dbf data base in the FAA Integrated Noise Model (INM) Version 5.0 to adjust part of the differences between the measured and calculated values of Day-night Sound Level (DNL) at locations that are close to Logan International Airport. The measurements were made by the permanent noise monitoring system at the airport, and the calculations were made by various versions of the Federal Aviation Administration (FAA) -Integrated Noise Model (INM). Differences of 4 to 9 Decibels (0) were observed at several of the noise monitoring stations, with the calculated values lower than the measured values in all but one site.

The adjusted INM calculations are to be used in the noise analysis of the Logan Airside Improvements Planning Project. This project will evaluate the impacts of a series of runway, taxiway and administrative improvements which are directed at reducing current and future congestion and delay conditions at Logan. These analyses will be published in a Federal Draft Environmental Impact Statement (Draft EIS) which will be issued jointly with a Draft Environmental Impact Report (DEIR) prepared pursuant to the Massachusetts Environmental Policy Act.

Since 1981 the noise contours at Logan have been calculated with the INM Version 3.9. In the intervening years the INM database has been upgraded three times from database # 9 to 11 and to INM 5.0. The current database contains data on 103 airplanes, 23 more than in database 9, and include many new models that are needed for the analysis of airport noise in future years. The basic computer program has also been upgraded and the newest version 5.0 became available in mid 1995. Version 5.0 is significantly enhanced in its capabilities over Version 3.9, particularly with respect to

the variety of output data available and its graphics. Because Version 5.0, with its database, is the most appropriate available airport noise model for predicting airport noise in future years, it is proposed to be used in the Airside Improvements Planning Project.

Because of the prior history of differences between calculated and measured values of DNL at close-in locations, an analysis was undertaken of the measured and calculated results for 1993 operations at Logan. The purpose of the analysis was to ascertain the magnitudes and possible causes for the differences, and examining the improvements that could be obtained by adjusting the INM. Table I contains the comparison of 1993 measured DNL values at the sound monitoring stations which are located close to Logan with values calculated by both INM Versions 3.9 and 5.0.. This table shows that both MM versions calculate DNL values that are generally lower than the measured values. The possible reasons for these differences become more evident when the results are grouped by the estimated probable most significant contributor to the DNL value, ie. "airborne takeoffs", "airborne landings", "ground roll during takeoffs" and "all".

The results at these 10 close-in noise monitoring sites show that the INM 3.9 DNL values average 0.2 dB high for "airborne takeoffs", 4.1 dB low for "airborne landings", 7.1 dB low for "ground roll during takeoffs" and 4.6 dB low for "all". The averages for Version 5.0 are similar in magnitude at these locations. The largest difference is associated with noise during the ground-roll segment of takeoff, and the next larger difference is associated with landing noise. The values for "airborne takeoff' are in agreement as would be expected, for this is the condition for which most of the INM validations have been made.

The underprediction of the noise during the ground roll segment of aircraft takeoffs appears to result from the algorithms in the R~M that calculate the noise during ground roll and the excess attenuation experienced by sound propagating over the ground.. The ground roll algorithms provide a reduction in the sound levels behind the aircraft, which appears to overstate the observed reductions at distances greater than 1000 feet. The excess ground attenuation algorithm provides values of attenuation that range from 0 dB at 0 distance up to about 14 dB at distances of 3000 feet or greater. These values of attenuation are in addition to those provided by inverse square loss and air absorption,

Because Logan has water between its runways and most of its closest neighbors, its conditions differ from those of grasscovered ground for which the INM excess ground attenuation was derived. The water does not have the ability to absorb sound as does grass. In addition, the cold temperature of the water probably stabilizes the thermal gradients so that the sound propagating parallel to the ground is not refracted upwards by the daytime sun as it is over ground. Finally, because aircraft generally take off into the wind, the nearest neighbors at Logan are rarely located upwind of an aircraft taking off on the nearest runway. Consequently, the noise that they hear from the ground roll takeoff segment is not often refracted upwards by wind gradients, affecting both the directivity pattern at distance and the excess ground attenuation. For all of these reasons it would be expected that the INM prediction of noise from ground roll is lower than the values experienced by the nearest residents at Logan.

At the two sites identified with "landing" noise the INM computed sound exposure levels for several individual representative aircraft appeared to be lower than data that were obtained for individual flights from the sound monitoring system. This may result from thrust variation during approach and the use of more thrust during the final stage of landing than that contained in the standard profiles in the RW database.

During 1994 we developed an adjustment to R*4M 3.9 to adjust for part of the underprediction of noise from takeoff ground-roll. This adjustment was used in calculating the forecast 1999 DNL 65 dB noise contour for the Home Sound Insulation Program. The adjustment consisted of a change in the algorithm for excess ground attenuation which delayed the full effect of the attenuation until a greater distance from the aircraft. In this analysis adjustments were developed for both takeoff round-roll and arrival profiles to be used with INM 5.0. The proposed takeoff ground-roll adjustment is an addition of 6 decibels to the noise from the airplane during ground-roll. The proposed arrival adjustment is an addition of 4 db to the noise from each type of jet airplane during the last stage of approach. Both adjustments are implemented in the profile points database input to INM 5.0 by increasing the thrust in the region of interest so that the model calculates an appropriately higher value of SEL during that part of the profile. Comparisons of the SEL values at selected locations for a variety of jet aircraft types are presented in Attachment A.

Table 2 contains the data from Table I with the addition of the results calculated from adjustments to the two INM versions. The adjustment to INM 5.0 profiles reduced the average difference between measured and calculated DNL to 2.2 dB, slightly better than resulted from the adjustment to R,TM 3.9. The landing adjustment to INM 5.0 profiles reduced the average difference to 2.3 dB compared to the 4.3 dB for the adjusted R4M 3.9, and the takeoff ground-roll adjustment reduced the average difference to 3.5 dB compared to 3.6 dB for the adjusted RTM 3.9. These adjusted values represent a clear improvement over the unadjusted values in their ability to match the measured values.

These results demonstrate that the noise at close in locations calculated with the adjusted profiles in the INM 5.0 model agrees more closely with the measured values then does the noise calculated with the standard profiles in the MM 5.0 model. Therefore, we request that the adjusted profiles for the INM 5.0 model be approved for use in the for the environmental studies of noise for the Airside Improvements Planning Project at Logan International Airport.

Sincerely,

Kenneth McK. Eldred

TABLE 1

COMPARISONS OF THE MEASURED DAY-NIGHT SOUND LEVEL VALUES AT CLOSE- IN LOGAN NOISE MONITORING SYSTEM LOCATIONS FOR THE 1993 ANNUAL OPERATIONS WITH THE VALUES CALCULATED BY DIFFERENT VERSIONS OF THE FAA INTEGRATED NOISE MODEL (INM)

NMS #	LOCATION	Measured Values	Calculated Values		Comparisons		Major Source
			INM3.9 DB 9	INM5.0 Std. DB	Meas - INM 3.9	Meas. INM 5.0	
3	S. Boston Yacht Club, S. Boston	69.3	63.1	63.3	6.2	6.0	Landing
4	Bayview & Grandview, Winthrop	79.8	81.6	81.0	-1.8	-1.2	Takeoff
5	Harborview& Faun Bar, Winthrop	73.3	71.9	72.2	1.4	1.1	Takeoff
6	Somerset & Johnson, Winthrop	71.1	61.5	62.4	9.6	8.7	Ground-roll
7	Loring Rd. near Court, Winthrop	74.1	69.7	71.1	4.4	3.0	Ground-roll
8	Morton & Amelia, Winthrop	68.4	65.8	66.2	2.6	2.2	All
9	Bayswater & Nancia, E. Boston	76.6	69.7	69.7	5.9	5.9	Ground-roll
10	Bayswater & Shawsheen, E. Boston	71.3	64.5	64.6	6.8	6.7	Ground-roll
14	Jeffries Point Yacht Club, E. Boston	67.4	58.6	59.4	8.8	8.0	T/O & G/R
16	Bradstreet Ave. & Sales, Revere	71.4	69.4	69.4	2.0	2.0	Landing
		Average of All data			4.6	4.2	
		Average of Takeoff data			-0.2	-0.0	
		Average of Landing data			4.1	4.0	
Values from HMMH Comparison		Average of Ground-roll data			7.1	6.5	

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TABLE 2

COMPARISONS OF THE MEASURED DAY-NIGHT SOUND LEVEL VALUES AT CLOSE- IN LOGAN NOISE MONITORING SYSTEM LOCATIONS FOR THE 1993 ANNUAL OPERATIONS WITH THE VALUES CALCULATED BY DIFFERENT VERSIONS OF THE FAA INTEGRATED NOISE MODEL (INM)

		Measured	Calculated Values				Comparisons				
NMS #	LOCATION	Values	INM3.9 DB9*	INM5.0 Std. DB	INM3.9 A DB9*	INM5.0 A Adj. DB	Meas - INM 3.9	Meas - INM 5.0	Meas - INM 3.9A	Meas - INM 5.OA	Major Source
3	S. Boston Yacht Club, S. Boston	69.3	63.1	63.3	62.8	65.8	6.2	6.0	6.5	3.5	Landing
4	Bayview & Grandview, Winthrop	79.8	81.6	81.0	81.6	81.4	-1.8	-1.2	-1.8	-1.6	Takeoff
5	Harborview& Faun Bar, Winthrop	73.3	71.9	72.2	71.9	72.3	1.4	1.1	1.4	1.0	Takeoff
6	Somerset & Johnson, Winthrop	71.1	61.5	62.4	66.9	66.4	9.6	8.7	4.2	4.7	Ground-roll
7	Loring Rd. near Court, Winthrop	74.1	69.7	71.1	74.4	75.2	4.4	3.0	-0.3	-1.1	Ground-roll
8	Morton & Amelia, Winthrop	68.4	65.8	66.2	66.8	6.7.8	2.6	2.2	1.6	0.6	Ail '
9	Bayswater & Nancia, E. Boston	75.6	69.7	69.7	72.0	70.8	5.9	5.9	3.6	4.8	Ground-roll
10	Bayswater & Shawsheen, E. Boston	71.3	64.5	64.6	67.4	66.1	6.8	6.7	3.9	5.2	Ground-roll
14	Jeffries Point Yacht Club, E. Boston	67.4	58.6	59.4	60.6	63.7	8.8	8.0	6.8	3.7	T/O & G/R
16	Bradstreet Ave. & Sales, Revere	71.4	69.4	69.4	69.4	70.4	2.0	2.0	2.0	1.0	Landing
				Average of AJI data			4.6	4.2	2.8	2.2	
				Average of Takeoff data			-0.2	-0.0	-0.2	-0.3	
				Average of Landing data			4.1	4.0	4.3	2.3	
	Values from HMMH Comparison			Average of Ground-roll data			7.1	6.5	3.6	3.5	

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Attachment A:

Comparisons of Takeoff and Landing Noise for Typical Jet Aircraft

The changes to the profiles in the INM 5.0 Database involved increasing the thrust at specific profile points in the PROF_PTS.DBF file so that the SEL computed from the appropriate noise table would be calculated at a higher value. This procedure was applied to the 48 INM jet aircraft that are expected to be used in the Boston Logan International Airside Study.

The takeoff profiles were modified to increase the SEL during ground roll by 6 dB at two profile points. They are the start of takeoff roll and the liftoff points, both at zero altitude. An additional point was inserted into the takeoff profile at 100 feet altitude with the standard database value to assure that any changes to the noise would be terminated by 100 foot altitude. The required standard values of thrust, speed and distance from start of roll for the 100 foot altitude point were derived from the database by interpolation between the 0 and 1000 foot datapoints. The approach profiles were modified to increase the SEL during the final phase of landing by 4 dB at two profile points. They are the 1000 foot altitude point and the touchdown point. at zero altitude. The change in thrust at each profile point was calculated by interpolation in the Thrust-SEL database table for each aircraft and stage length using a 1000 foot slant distance.

Table A1 summarizes the changes along a 1000 foot sideline and the centerline for a 727EM1 aircraft. during takeoff and landing. The 727EM1 with Stage Length I has a takeoff roll of 4513 feet and climbs through a 100 foot altitude at 5014 feet from the start of its takeoff roll. Table AIA shows that its noise is 6 dB greater while the aircraft is on the runway (the 0 and 0-5 NM points) and is only 1.4 dB greater at I NM from the start. This 1.4 dB increase over the standard probably results from the addition of the noise from the takeoff roll profile segments. At greater distances, 1. 5 NM from the start of takeoff roll and beyond, the adjustment has no effect. The differences are slightly different along the centerline because the 6 dB increase was calculated for a 1000 foot slant distance and the relationship between SEL and thrust varies with slant distance.

Table A1B gives a similar comparison for landing of the 727EM1 aircraft. The standard profile descends through a 1000 foot altitude at about 3 NM from the landing threshold. The noise for standard and adjusted computations is the same at distances greater than 4 NM . Between 4 and 3 NM from threshold the SEL difference increases to 3.1 dB and averages out 4 dB from 2.5 NM to the threshold at 0 NM. The results along the centerline are essentially similar.

Table A2 gives a comparison of takeoff noise for both the 1000 foot sideline and the centerline for several aircraft types and for Stage Length 1. The results are given for 4 grid points which cover the first 1.5 NM from the start of takeoff roll. The SEL differences along the foot sideline are essentially 6 dB, as planned. Most of the values at 0.5 NM approach 6 dB, except for a few aircraft which have climbed to over 100 feet by the 0.5 NM location. By 1.0 NM from the start of takeoff roll most of the aircraft are above 100 feet and the differences in SEL are approaching zero. At 1.5 NM all of the

differences are essentially zero. The blank entries in the runway centerline data result from the fact that the cumulative contributions of these aircraft to the total noise exposure was less than 3 %.

Table A3 gives a similar comparison for 5 points in the last 2 NM to the landing threshold. The results along the 1000 foot sideline are close to the planned 4 dB. The average difference along the centerline are slightly lower and more variable. This increase in variability probably results from the differences in the slopes of the SEL-Thrust-Distance relationships for the different engine noise characteristics.

TABLE A1A

COMPARISON OF TAKEOFF NOISE FOR STAGE LENGTH 1 727EM1 AIRCRAFT ALONG THE RUNWAY CENTERLINE AND ALONG A 1000 FOOT SIDELINE AT 0.5 NM INTERVALS FROM START OF THE TAKEOF TAKEOFF ROLL CALCULATED WITH BOTH STANDARD AND ADJUSTED INM 5.0 PROFILES

Distance In NM from Start	1000 Feet Sideline			Runway Centerline		
	Standard SEL in dB	Adjusted SEL in dB	Difference in dB	Standard SEL in dB	Adjusted SEL in dB	Difference in dB
0.0	108.4	114.4	6.0	151.2	157.0	5.8
0.5	102.8	108.8	6.0	145.4	151.2	5.8
1.0	103.4	104.8	1.4	136.5	142.2	5.7
1.5	105.7	105.6	-0.1	112.9	112.9	0.0
2.0	104.6	104.6	0.0	108.4	108.4	0.0
2.5	103.3	103.3	0.0	105.9	105.9	0.0
3.0	101.7	101.7	0.0	103.8	103.8	0.0
3.5	99.7	99.7	0.0	101.3	101.3	0.0
4.0	97.8	97.8	0.0	99.0	99.0	0.0
4.5	96.4	96.4	0.0	97.3	97.3	0.0
5.0	95.2	95.2	0.0	95.9	95.9	0.0
5.5	94.1	94.1	0.0	94.7	94.7	0.0
6.0	93.1	93.1	0.0	93.6	93.6	0.0
6.5	92.3	92.3	0.0	92.8	92.8	0.0
7.0	91.5	91.5	0.0	91.9	91.9	0.0
7.5	90.8	90.8	0.0	91.2	91.2	0.0
8.0	90.0	90.0	0.0	90.4	90.4	0.0
8.5	89.3	89.3	0.0	89.6	89.6	0.0
9.0	88.5	88.5	0.0	88.8	88.8	0.0
9.5	87.8	87.8	0.0	88.1	88.1	0.0
10.0	87.1	87.1	0.0	87.4	87.4	

TABLE A1B

COMPARISON OF APPROACH NOISE FOR AN 727EMI AIRCRAFT ALONG THE RUNWAY CENTERLINE AND ALONG A 1000 FOOT SIDELINE AT 0.5 NM INTERVALS FROM THE RUNWAY LANDING THRESHOLD CALCULATED WITH BOTH STANDARD AND ADJUSTED INM 5.0 PROFILES

Distance In NM from Threshold	1000 Feet Sideline			Runway Centerline		
	Standard SEL in dB	Adjusted SEL in dB	Difference in dB	Standard SEL in dB	Adjusted SEL in dB	Difference in dB
-10.0	72.1	72.1	0.0	72.6	72.6	0.0
-9.5	72.9	72.9	0.0	73.4	73.4	0.0
-9.0	73.6	73.6	0.0	74.2	74.2	0.0
-8.5	74.4	74.4	0.0	76.1	76.1	0.0
-8.0	75.4	75.4	0.0	77.0	77.0	0.0
-7.5	76.2	76.2	0.0	78.2	78.2	0.0
-7.0	77.3	77.3	0.0	79.2	79.2	0.0
-6.5	78.2	78.2	0.0	80.3	80.3	0.0
-6.0	79.2	79.2	0.0	81.4	81.5	0.1
-5.5	80.2	80.2	0.0	82.6	82.6	0.0
-5.0	81.2	81.2	0.0	84.0	84.0	0.0
-4.5	82.2	82.2	0.0	85.3	86.1	0.8
-4.0	83.1	83.9	0.8	86.8	88.3	1.5
-3.5	83.9	85.5	1.6	88.4	91.6	3.2
-3.0	84.9'	88.0	3~ 1	89.8	93.6	3.8
-2-5	85.3	89.2	3.9	91.5	95.3	3.8
-2.0	85.7	89.6	3.9	93.4	97.3	3.9
-1.5	85.9	89.9	4~O	95.8	99.8	4.0
-1.0	85.8	89.8	4.0	99.5	103.6	4.1
-0.5	84.9	89.0	4.1	105.7	109.9	4.2
0.0	82.1	85.8	3.7	87.4	87.4	0.0

TABLE A2

COMPARISON OF TAKEOFF NOISE FOR STAGE LENGTH 1 AIRCRAFT ALONG THE RUNWAY CENTERLINE AND ALONG A 1000 FOOT SIDELINE AT 0.5 NM INTERVALS FROM START OF THE TAKEOFF ROLL FOR SEVERAL AIRCRAFT CALCULATED WITH BOTH STANDARD AND ADJUSTED INM 5.0 PROFILES

Distance In NM from Start	Aircraft Type	1000 Feet Sideline			Runway Centerline		
		Standard SEL in dB	Adjusted SEL in dB	Difference in dB	Standard SEL in dB	Adjusted SEL in dB	Difference in dB
0.0	727EMI	102.40	108.40	6.0	145.20	151.00	5.8
0.0	727EM2	105.80	111.80	6.0	148.50	154.40	5.9
0.0	727015	112.20	118.20	6.0	153.00	158.80	5.8
0.0	727Q7	107.70	113.70	6.0	148.70	154.50	5.8
0.0	727Q9	109.20	115.20	6.0	150.00	155.80	5.8
0.0	737400	96.60	102.60	6.0			
0.0	737D17	111.80	117.80	6.0	152.80	158.60	5.8
0.0	737ONH	102.20	108.20	6.0	145.10	148.80	3.7
0.0	74720B	107.20	113.20	6.0	149.10	155.30	6.2
0.0	747400	102-70	108.70	6.0	143.50	148.60	5.1
0.0	767300	103.10	109.10	6.0	141.50	146.20	4.7
0.0	767CF6	97.70	103.70	6.0			
0.0	767JT9	97.20	103.20	6.0			
0.0	A300	97.70	103.70	6.0			
0.0	A31 0	97.60	103.60	6.0			
0.0	DC1010	98.10	104.10	6.0			
0.0	DC1030	101.20	107.20	6.0			
0.0	DC1040	99.60	105.60	6.0			
0.0	DC870	99.50	105.50	6.0			
0.0	DC8QN	108.40	114.40	6.0			
0.0	DC930H	100.90	106.80	5.9			
0.0	DC950	110.00	116.00	6.0			
0.0	DC907	103.30	109.30	6.0			
0.0	DC9Q9	105.20	111.20	6.0			
0.0	F10065	97.20	103.20	6.0			
0.0	F28MK2	108.10	114.10	6.0			
0.0	F28MK4	104.70	110.40	5.7			
0.0	L1011	99.80	105.80	6.0			
0.0	L10115	101.30	107.30	6.0			
0.0	M011GE	98.70	104.70	6.0			
0.0	MD11PW	97.90	104.00	6.1			
0.0	MD81	98.30	104.30	6.0			
0.0	MD82	99.80	105.80	6.0			
0.0	MD83	100.90	106.90	6.0			
0.5	727EMI	96.10	102.00	5.9	138.80	144.60	5.8
0.5	727EM2	100.30	106.30	6.0	142.60	148.40	5.8
0.5	727Q 15	106.00	111.90	5.9	146.40	152.00	5.6
0.5	727Q7	100.30	106.30	6.0	141.30	147.10	5.8
0.5	72709	103.20	109.40	6.2	143.80	149.80	6.0
0.5	737D17	103.30	109.00	5.7	144.10	149.90	5.8
0.5	7370NH	94.40	99.90	5.5	137.10	142.90	5.8
0.5	74720B	98.70	104.70	6.0	140.30	146.50	6.2
0.5	747400	94.60	100.60	6.0	135.60	140.60	5.0
0.5	767300	95.70	98.00	2.3			
0.5	767CF6	89.50	95.20	5.7			
0.5	A300	90.20	95.90	5.7			
0.5	A31 0	89.60	97.40	7.8			
0.5	DC1010	91.80	97.10	5.3	134.60	138.90	4.3
0.5	DC1030	93.90	99.60	5.7	136.20	141.00	4.8
0.5	DC 1040	93.60	100.30	6.7	136.10	141.60	5.5
0.5	DC870	90.90	96.60	5.7	132.40	137.90	5.5
0.5	DC8QN	101.60	107.40	5.8	142.10	147.70	5.6
0.5	DC930H	95.40	100.40	5.0	138.10	141.60	3.5
0.5	OC950	103.40	109.30	5.9	144.30	150.10	5.8
0.5	DC9Q7	102.60	102.60	0.0			
0.5	OCS09	98.80	104.60	5.8	139.80	145.60	5.8
0.5	F28MK2	99.10	104.80	5.7	140.90	147.10	6.2
0.5	F28MK4	96.20	101.80	5.6	138.30	145.00	6.7

TABLE A2 CONTINUED

Distance In NM from Start	Aircraft Type	1000 Feet Sideline Standard SEL in dB	1000 Feet Sideline Adjusted SEL in dB	1000 Feet Sideline Difference in dB	Runway Centerline Standard SEL in dB	Runway Centerline Adjusted SEL in dB	Runway Centerline Difference in dB
0.5	L1011	94.30	100.30	6.0	136.50	141.30	4.8
0.5	L10115	94.70	100.70	6.0	137.20	142.00	4.8
0.5	MD11GE	91.40	97.30	5.9	132.70	138.50	5.8
0.5	MD1 1 PW	90.50	96.50	6.0	132.70	138.50	5.8
0.5	MD81	91.40	97.30	5.9	132.10	138.20	6.1
0.5	MD82	92.50	98.30	5.8	133.20	139.30	6-1
0.5	MD83	93.90	99.80	5.9	134.60	140.70	6.1
1.0	727EMI	99.4	102.0	Z6	112.0	112.0	0.0
1.0	727EM2	99.7	100.6	0.9	119.4	119.5	0.1
1.0	727015	104.9	105.8	0.9	122.7	122.8	0.1
1.0	727Q7	103.3	103.2	-0.1	114.2	114.0	-0.2
1.0	727Q9	99.2	104.4	5.2	128.3	133.5	5.2
1.0	737D17	109.3	109.2	-0.1	114.5	114.5	0.0
1.0	737QNH	100.2	100.1	-0.1			
1.0	74720B	103.5	103.4	-0.1	110.3	110.3	0.0
1.0	747400	98.8	98.8	0.0			
1.0,	767300	99.5	99.3	-0.2			
1.0	767CF6	95.1	95.1	0.0			
1.0	767JT9	95.0	94.9	-0.1			
1.0	A300	95.9	95.8	-0.1			
1.0	A31 0	95.5	95.5	0.0			
1.0	A320	93.7	93.7	0.0			
1.0	DC1010	96.5	96.4	-0.1			
1.0	DC1030	99.4	99.4	0.0			
1.0	DC1040	97.3	97.5	0.2			
1.0	DC870	96.6	96.6	0.0			
1.0	DC8QN	106.9	106.9	0.0			
1.0	DC930H	99.2	100.0	0.8			
1.0	DC950	108.9	108.9	0.0	115.9	115.9	0.0
1.0	DC9Q7	103.1	103.1	0.0			
1.0	DC9Q9	104.3	104.2	-0.1	111.9	111.9	0.0
1.0	F28MK2	104.9	104.9	0.0			
1.0	F28MK4	102.1	102.0	-0.1			
1.0	L1011	96.1	96.1	0.0	110.8	110.8	0.0
1.0	L10115	98.5	98.4	-0.1			
1.0	LEAR35	95.6	95.6	0.0			
1.0	MD11GE	96.2	96.2	0.0			
1.0	MD11PW	94.8	94.7	-0.1			
1.0	MD81	96.3	96.3	0.0			
1.0	MD82	97.8	97.8	0.0			
1.0	MD83	98.5	98.5	0.0			
1.5	727EMI	99.6	99.6	0.0	104.4	104.4	0.0
1.5	727EM2	103.0	103.0	0.0	109.3	109.3	0.0
1.5	727Q15	108.4	108.4	0.0	114.0	114.0	0.0
1.5	727Q7	103.6	103.6	0.0	107.9	107.9	0.0
1.5	72709	104.9	104.9	0.0	112.4	112.4	0.0
1.5	7371317	107.9	107.9	0.0	110.2	110.2	0.0
1.5	737QNH	98.3	98.3	0.0	100.8	100.8	0.0
1.5	74720B	102.2	102.2	0.0	104.9	104.9	0.0
1.5	747400	97.8	97.8	0.0	100.6	100.6	0.0
1.5	767300	96.1	96.1	0.0	97.9	97.9	0.0
1.5	767CF6	92.9	93.0	0.1	96.5	96.5	0.0
1.5	A300	94.2	94.2	0.0			
1.5	A31 0	93.6	93.4	-0.2			
1.5	DC1010	95.8	95.8	0.0	99.6	99.6	0.0
1.5	DC1030	97.5	97.5	0.0	100.0	100.0	0.0
1.5	DC1040	97.2	97.2	0.0	101.3	101.4	0.1
1.5	DC870	95.1	95.1	0.0	97.4	97.4	0.0
1.5	DC80N	106.2	106.2	0.0	109.0	109.0	0.0
1.5	DC930H	99.6	99.3	-0.3	103.0	103.0	0.0
1.5	DC950	108.1	108.1	0.0	111.2	111.2	0.0

TABLE A2 CONTINUED

Distance In NM from Start	Aircraft Type	1000 Feet Sideline Standard SEL in dB	1000 Feet Sideline Adjusted SEL in dB	1000 Feet Sideline Difference in dB	Runway Centerline Standard SEL in dB	Runway Centerline Adjusted SEL in dB	Runway Centerline Difference in dB
1.5	DC9Q7	98.8	98.7	-0.1	100.5	100.4	-0.1
1.5	DC9Q9	103.7	103.7	0.0	107.1	107.1	0.0
1.5	F28MK2	103.5	103.5	0.0	105.9	105.9	0.0
1.5	F28MK4	100.5	100.5	0.0	103.1	103.1	0.0
1.5	L1011	96.9	96.9	0.0	101.4	101.4	0.0
1.5	L10115	97.6	97.6	0.0	100.9	100.9	0-0
1.5	LEAR35	94.1	94.0	-0.1	97.6	97.6	0.0
1.5	MD11GE	95.1	95.1	0.0	97.8	97.8	0.0
1.5	MD11PW	94.1	94.1	0.0	97.2	97.2	0.0
1.5	MD81	95.8	95.8	0.0	98.9	98.9	0.0
1.5	M082	96.7	96.7	0.0	99.5	99.4	-0.1
1.5	M083	97.8	97.8	0.0	100.8	100.8	0.0

TABLE A3

COMPARISON OF APPROACH NOISE FOR AIRCRAFT ALONG THE RUNWAY CENTERLINE AND ALONG A 1000 FOOT SIDELINE AT 0.5 NM INTERVALS FROM 2 NM OUT FROM THE LANDING THRESHOLD FOR SEVERAL AIRCRAFT CALCULATED WITH BOTH STANDARD AND ADJUSTED INM 5.0 PROFILES

Distance In NM from Threshold	Aircraft Type	1000 Feet Sideline			Runway Centerline		
		Standard SEL in dB	Adjusted SEL in dB	Difference in dB	Standard SEL in dB	Adjusted SEL in dB	Difference in dB
-2.0	727EM1	85.7	89.6	3.9	91.5	95.3	3.8
-2.0	727EM2	86.5	90.5	4.0	91.8	96.1	4.3
-2.0	727015	87.8	91.9	4.1	92.8	96.9	4.1
-2.0	72707	87.5	91.5	4.0	92.5	96.5	4.0
-2.0	72709	87.9	91.8	3.9	92.9	96.8	3.9
-2.0	737300	63.2	87.3	4.1	88.7	92.2	3.5
-2.0	7373B2	93.2	87.3	4.1	88.7	92.2	3.5
-2.0	737400	83.4	87.5	4.1	88.8	92.4	3.6
-2.0	7375W	83.3	87.4	4.1	88.7	92.2	3.5
-2.0	737D17	84.2	88.1	3.9	89.2	93.1	3.9
-2.0	737QN	83.8	87.3	3.5	88.8	92.4	3.6
-2.0	767300	86.4	90.7	4.3	92.0	95.6	3.6
-2.0	767CF6	85.7	90.0	4.3	91.3	94.9	3.6
-2.0	767JT9	85.8	90.0	4.2	91.3	94.9	3.6
-2.0	A300	85.3	89.8	4.5	91.4	95.3	3.9
-2.0	A310	84.9	89.0	4.1	91.0	94.6	3.6
-2.0	BAE146	82.1	86.1	4.0	87.4	91.3	3.9
-2.0	BAE300	82.0	85.6	3.6	87.3	90.9	3.6
-2.0	DC1010	86.0	89.9	3.9	92.2	95.9	3.7
-2.0	DC1030	86.2	90.0	3.8	92.4	95.9	3.5
-2.0	OCIO40	85.4	89.0	3.6	91.6	95.0	3.4
-2.0	DC870	84.8	88.8	4.0	90.0	93.9	3.9
-2.0	DC930H	83.8	93.5	9.7	89.3	93.2	3.9
-2.0	DC950	84.9	88.9	4.0	89.9	93.9	4.0
-2.0	DC907	83.5	87.4	3.9	88.5	92.4	3.9
-2.0	DC909	84.5	88.5	4.0	89.5	93.5	4iO
-2.0	F10062	81.1	85.2	4.1	86.3	90.3	4.0
-2.0	F28MK2	87.5	91.7	4.2	92.7	96.5	3.8
-2.0	F28MK4	87.4	91.4	4.0	92.5	96.2	3.7
-2.0	L1011	88.1	92.0	3.9	94.2	97.9	3.7
-2.0	L10115	88.3	91.9	3.6	94.4	97.8	3.4
-2.0	MD83	81.5	85.2	3.7	86.2	90.2	4.0
-1.5	727EM2	85.9	89.9	4.0	93.4	97.3	3.9
-1.5	727015	86.7	90.8	4.1	93.7	98.0	4.3
-1.5	72707	87.9	92.0	4.1	94.5	98.6	4.1
-1.5	72709	87.6	91.7	4.1	94.2	98.3	4.1
-1.5	737300	88.0	92.0	4.0	94.6	98.5	3.9
-1.5	737382	83.4	87.5	4.1	90.6	93.9	3.3
-1.5	737400	83.4	87.5	4.1	90.6	93.9	3.3
-1.5	737500	83.5	87.6	4.1	90.7	94.0	3.3
-1.5	737DI7	83.4	87.5	4.1	90.6	93.9	3.3
-1.5	737ON	84.3	88.3	4.0	90.9	94.8	3.9
-1.5	74720B	83.9	87.5	3.6	90.5	94.1	3.6
-1.5	747400	92.0	96.1	4.1	99.2	103.0	3.8
-1.5	757PW	90.6	94.6	4.0	98.2	101.7	3:5
-1.5	757RR	84.0	86.8	2.8	91.2	94.0	2.8
-1.5	767300	82.4	88.2	5.8	89.4	94.8	5.4
-1.5	767CF6	86.7	90.9	4.2	93.8	97.2	3.4
-1.5	767JT9	86.0	90.1	4.1	93.1	96.5	3.4
-1.5	A300	86.0	90.2	4.2	93.2	96.6	3.4
-1.5	A31 0	85.6	90.0	4.4	93.5	97.3	3.8
-1.5	BAE146	85.2	89.2	4.0	93.1	96.6	3.5
-1.5	BAE300	82.3	86.3	4.0	89.1	92.7	3.6
-1.5	DC1010	82.2	85.8	3.6	94.5	98.0	3.5
-1.5	DC1030	86.2	90.2	4.0	94.6	98.1	3.5
-1.5	DC1040	85.6	a9.3	3.7	93.9	97.2	3.3
-1.5	DC870	84.9	88.9	4.0	91.8	95.7	3.9
-1.5	DC8QN	89.6	93.7	4.1	98.0	101.0	3.0
-1.5	DC930H	84.0	87.9	3.9	91.1	95.1	4.0
-1.5	DC950	85.0	89.0	4.0	91.6	95.6	4.0
-1.5	DC9Q7	63.6	87.6	4.0	90.2	94.2	4.0
-1.5	DC909	84.6	88.6	4.0	91.2	95.2	4.0

TABLE A3 CONTINUED

Distance In NM from Threshold	Aircraft Type	1000 Feet Sideline Standard SEL in dB	1000 Feet Sideline Adjusted SEL in dB	1000 Feet Sideline Difference in dB	Runway Centerline Standard SEL in dB	Runway Centerline Adjusted SEL in dB	Runway Centerline Difference in dB
-1.5	F 10062	81.2	85.3	4.1	88.0	92.0	4.0
-1.5	F28MK2	87.7	91.8	4.1	94.6	98.2	3.6
-1.5	F28MK4	87.6	91.6	4.0	94.2	97.7	3.5
-1.5	L1011	88.3	92.3	4.0	96.3	99.9	3.6
-1.5	L10115	88.5	92.2	3.7	96.5	99.8	3.3
-1.5	MD83	81.5	85.6	4.1	87.6	91.7	4A
-1.0	727EM1	85.8	89.8	4.0	95.8	99.8	4.0
-1.0	727EM2	86.5	90.7	4.2	96.1	100.6	4.5
-1.0	727015	87.7	91.9	4.2	96.7	100.8	4.1
-1.0	727Q7	87.4	91.5	4.1	96.4	100.5	4.1
-1.0	72709	87.8	91.8	4.0	96.8	100.7	3.9
-1.0	737300	83.3	87.3	4.0	93.0	96.1	3.1
-1.0	7373132	83.3	57.3	4.0	93.0	96.1	3.1
-1.0	737400	83.4	87.5	4.1	93.2	96.2	3.0
-1.0	7375W	83.3	87.3	4.0	93.1	96.1	3.0
-1.0	737D17	84.1	88.1	4.0	93.1	97.1	4.0
-1.0	737QN	93.7	a7.3	3.6	92.7	96.3	3.6
-1.0	74720B	91.9	96.0	4.1	101.5	105.3	3.8
-1.0	747400	90.5	94.5	4.0	100.8	104.1	3.3
-1.0	767300	86.6	90.7	4.1	96.2	99.3	3.1
-1.0	767CF6	85.9	90.0	4.1	95.5	98.6	3.1
-1.0	767JTS	86.0	90.0	4.0	95.6	98.7	3.1
-1.0	A300	85.5	89.9	4.4	96.2	99.8	3.6
-1.0	A310	85.1	89.2	4.1	95.9	99.2	3.3
-1.0	BAE146	82.1	86.1	4.0	91.4	95.4	4.0
-1.0	ELAE300	82.1	85.7	3.6	91.4	95.0	3.6
-1.0	DC1010	86.2	90.1	3.9	97.3	100.8	3.5
-1.0	D01030	86.4	90.2	3.8	97.5	100.8	3.3
-1.0	DC1040	85.6	89.2	3.6	96.8	100.0	3.2
-1.0	DC870	84.8	88.8	4.0	94.2	98.0	3.8
-1.0	DC8QN	89.6	93.6	4.0	100.9	103.5	2-6
-1.0	DC930H	83.8	87.9	4.1	93.6	97.6	4.0
-1.0	DC950	84.8	88.9	4.1	93.8	97.8	4.0
-1.0	DC9Q7	83.4	87.4	4.0	92.4	96.4	4.0
-1.0	DC9Q9	84.4	88.5	4.1	93.4	97.4	4.0
-1.0	F10062	81.1	85.2	4.1	90.2	94.1	3.9
-1.0	F28MK2	87.5	91.6	4.1	97.1	100.3	32
-1.0	F28MK4	87.4	91.4	4.0	96.5	99.8	3.3
-1.0	L1011	88.2	92.2	4.0	99.1	102.7	3.6
-1.0	L10115	88.4	92.2	3.8	99.3	102.6	3.3
-1.5	727EMI	84.9	89.0	4.1	99.5	103.6	4.1
-1.5	727EM2	85.6	89.9	4.3	99.7	104.3	4.6
-1.5	727Q15	86.8	91.0	4.2	99.7	103.9	4-2
-1.5	727Q7	86.5	90.6	4.1	99.5	103.6	4.1
-1.5	727Q9	86.9	90.9	4.0	99.8	103.8	4.0
-1.5	737300	82.4	86.4	4.0	96.7	99.3	2-6
-1.5	7373132	82.4	86.4	4.0	96.7	99.3	2-6
-1.5	737400	82.5	86.6	4.1	96.8	99.4	2-6
-1.5	737500	82.4	86.4	4.0	96.8	99.4	2-6
-1.5	7371317	63.2	87.2	4.0	96.1	100.2	4.1
-1.5	737QN	$2.8	86.4	3.6	95.8	99.4	3.6
-1.5	74720B	91.0	95.1	4.1	104.9	108.7	3.8
-1.5	747400	89.7	93.7	4.0	104.7	107.5	2-8
-1.5	767300	85.8	89.8	4.0	99.7	102.1	2-4
-1.5	767CF6	85.1	89.1	4.0	99.0	101.5	2-5
-1.5	767JTS	85.1	89.1	4.0	99.0	101.6	2-6
-1.5	A300	84.7	89A	4.4	100.2	103.5	3.3
-1.5	A310	84.3	88.3	4.0	99.9	102.9	3.0
-1.5	BAE146	81.2	85.3	4.1	94.6	98.6	4.0
-1.5	BAE300	81.2	84.8	3.6	94.5	98.2	3-7
-1.5	DC1010	85.3	89.3	4.0	101.5	104.8	3.3
-1.5	DC1030	85.6	89.3	3.7	101.7	104.8	3-1
-1.5	DC1040	84.7	88.4	3.7	101.0	104.0	3.0
-1.5	DC870	83.9	87.9	4.0	97.8	101.6	3.8
-1.5	DC8QN	88.7	92.7	4.0	105.1	107.1	2-0
-1.5	DC930H	83.0	87.0	4.0	97.4	101.3	3-9
-1.5	DC950	83.9	88.0	4.1	96.9	100.9	4.0

TABLE A3 CONTINUED

Distance In NM from Threshold	Aircraft Type	1000 Feet Sideline Standard SEL in dB	1000 Feet Sideline Adjusted SEL in dB	1000 Feet Sideline Difference in dB	Runway Centerline Standard SEL in dB	Runway Centerline Adjusted SEL in dB	Runway Centerline Difference in dB
-1.5	DC9Q7	82.5	86.5	4.0	95.5	99.5	4.0
-1.5	DC9Q9	83.5	87.6	4.1	96.5	100.5	4.0
-1.5	F10062	80.1	84.3	4.2	93.3	97.3	4.0
-1.5	F28MK2	86.5	90.6	4.1	100.7	103.4	2-7
-1.5	F28MK4	86.5	90.5	4.0	99.9	103.0	3-1
-1.5	L1011	87.3	91.4	4.1	103.1	106.5	3.4
-1.5	L10115	87.5	91.3	3.8	103.3	106.5	3-2
0.0	727EM1	82.1	85.8	3.7	105.7	109.9	4.2
0.0	727EM2	82.9	86.7	3.8	106.0	110.6	4.6
0.0	727015	84.0	87.8	3.8	106.0	110.1	4.1
0.0	72707	83.6	$7.5	3.9	105.7	109.9	4.2
0.0	72709	83.9	87.8	3.9	106.0	110.1	4.1
0.0	737300	79.2	83.1	3.9	163.0	105.6	2.6
0.0	737382	79.2	83.1	3.9	103.0	105.6	2.6
0.0	737400	79.4	83.3	3.9	103.1	105.7	2.6
0.0	737500	79.2	83.1	3.9	103.0	105.7	2.7
0.0	737017	81.1	84.3	3.2	102.4	106.5	4.1
0.0	737ON	80.4	83.4	3.0	102.0	105.7	3.7
0.0	74720B	87.9	91.8	3.9	111.2	115.0	3.8
0.0	747400	86.4	90.4	4.0	111.0	113.8	2.8
0.0	767300	82.6	86.6	3-8	106.0	108.4	2.4
0.0	767CF6	81.9	85.8	3.9	105.2	107.8	2.6
0.0	767JT9	82.0	85.8	3.8	105.3	107.8	2.5
0.0	A300	81.7	85.8	4.1	106.6	109.8	3.2
0.0	A310	81.3	85.1	3.8	106.2	109.2	3.0
0.0	BAE146	78.1	82.0	3.9	100.8	104.9	4.1
0.0	BAE300	78.1	81.5	3.4	100.8	104.5	3.7
0.0	DC1010	82.3	86.1	3.8	107.8	111.1	3.3
0.0	DC1030	82.8	86.1	3.3	108.0	111.1	3.1
0.0	DC1040	82.0	85.4	3.4	107.3	110.3	3.0
0.0	DC870	80.8	84.7	3.9	104.1	107.9	3.8
0.0	DC80N	85.9	89.6	3.7	111.4	113.4	2.0
0.0	DC930H	80.2	83.9	3.7	103.7	107.6	3.9
0.0	DC950	81.5	85.0	3.5	-103.1	107.2	4.1
0.0	DC9Q7	79.9	83.5	3.6	101.7	105.8	4.1
0.0	DC9Q9	80.8	84.5	3.7	IG2.7	106.8	4.1
0.0	F 10062	63.6	81.0	-2.6	99.6	103.6	4.0
0.0	F28MK2	83.5	87.4	3.9	106.9	109.7	2.8
0.0	F2aMK4	84.2	87.3	3.1	106.1	109.2	3.1
0.0	L1011	84.5	88.2	3.7	109.4	112.9	3.5
0.0	L10115	79.6	88.2	8.6	109.6	112.8	3.2

Memorandum from FTA to the FAA Regarding Noise Screening Procedures

MEMO

To: Federal Aviation Administration, New England Region
Attention: ANE-520.4, Terry Flieger, Airspace Branch
From: Flight Transportation Associates, Inc
Date: February 19, 1999
Subject: Application of FAA Notice 7210.360 *Noise Screening Procedure for Certain Air Traffic Actions Above 3,000' AGL* to Proposed Runway 14/32 Operations

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1. Purpose: This memorandum provides information on potential increases in noise exposure above 3,000' above ground level (AGL) due to future jet traffic on the proposed unidirectional Runway 14/32 at Boston's Logan International Airport. FAA Notice 7210.360 provides a method for the screening of air traffic changes that may result in increased aircraft noise exposure. The notice applies only to airports where 1) there are at least 1,500 large jet airplanes[1] operations per year (either current or projected), 2) modifications represent a permanent or a planned test; 3) changes concern arrival/departure routes or tracks, used by large airplanes, between 3,000 and 7,000 feet AGL (arrivals) or 3,000 and 18,000 feet (departures) AGL.[2]

2. Background: As part of the Logan Airside Improvements Program a new unidirectional Runway 14/32 is proposed. During the EIS process, thorough investigation of potential aircraft noise impacts below 3,000 feet AGL was conducted using the FAA Integrated Noise Model. To further evaluate potential noise impacts for jet operations above 3,000 feet AGL, FAA Notice 7210.360 may be applied. This FAA notice originates from Order 1050.1 D.

a. FAA Order 1050.1 D, *Policies and Procedures for Considering Environmental Impacts,* establishes policy and procedures and assigns responsibility for ensuring agency compliance with the environmental procedures set forth in the Council on Environmental Quality regulation for implementing the procedural provisions of the National Environmental Policy Act. Typically, the establishment of airways, jet routes or revised air traffic control procedures above 3,000 feet AGL are excluded from the requirement for an Environmental Assessment (EA). However, even in cases where changes will result in noise levels well below the standard criteria for a finding of a significant impact, changes may be considered controversial and thus should be further investigated. Order 1050.1 D provides that actions involving jet aircraft which may generate an increase in the average day/night sound level (DNL) of 5 decibels should be the subject of further analysis. Notice 7210.360 provides a means to assist decision makers as to whether changes normally excluded from the EA process should in fact be the subject of further investigation.[3]

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[1] For purpose of this memo, the term "larger jet" refers only to jet aircraft of 75,000 lbs or greater.
[2] FAA Notice 7210.360, page 2, FAA, 9/14/90
[3] Ibid.

b. Logan Airside Improvements Project (LAIP). The ongoing efforts to improve Logan Airport efficiency and reduce congestion have included a number of recent projects. LAIP focuses on the airside features of Logan including runway and taxiway improvements. A key proposal involves the building of a new unidirectional Runway 14/32 on the southwestern edge of the airfield, near-parallel with Runway 15R/33L. The proposed runway is to be an "over water" operation with departures only in the 14 direction and arrivals only in the 32 direction. Primarily a regional services runway, it will be used most often by turboprop aircraft with jet traffic limited to those capable of operating on the 5,000 ft. runway.

c. Because the application of N7210.360 involves the examination of large jet operations (over 75,000 lbs.) the LAIP 2010 45 Million passenger, high-operations planning scenario (45MH) was selected for the screening analysis. Of all the forecast scenarios used in LAIP, the 45MH fleet contains the largest number of jet operations (all are Stage 3). It is a "worse case" scenario unlikely to actually occur. This projected fleet contains an average of 520 daily large jet arrivals and an equivalent number of departures. Of the arrivals, approximately 3 percent will use Runway 32 while approximately 1 percent will use Runway 14. All remaining large jet operations will use currently existing runways. For purposes of the N7210.360 screening, the "minimum number of average daily large jet operations" is used. This is determined by comparing 5 percent of the total number of Stage 3 operations with the "threshold operations" provided in the notice.

d. New Jet Flight Tracks proposed for Runway 14/32 are shown in Figure 1. As part of LAIP, actual ARTS data was used to develop INM flight tracks for all operating directions at Logan. The INM tracks were assigned aircraft based on INM type. This allowed the segregation of jet tracks/operations from prop tracks/operations necessary for the screening. Only jet tracks are considered or shown in this analysis. The specific number and type of aircraft assigned to each track was based on actual operations and forecasts developed for LAIP.

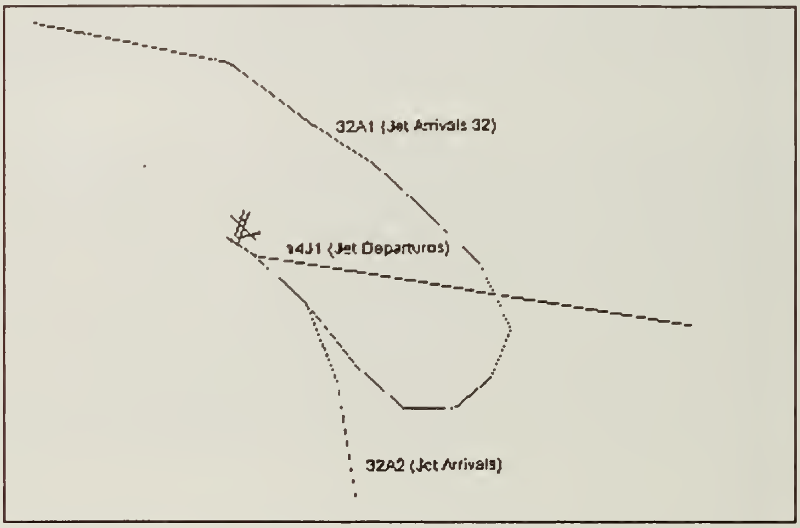

Figure I Runway 14/32 Jet Tracks

New jet tracks for a unidirectional Runway 14/32 were proposed based on safety, efficiency, minimal changes to existing airspace and procedures, and to avoid overflying of residential areas. Track 32A1 coincides with the existing right downwind for 33L until merging with the final for Runway 32 below 3,000 feet. Tracks 32A2 and 14J1 are close enough to existing jet tracks such that no overflights of new areas are considered to occur (see Table 2).

3. Procedure: The application of FAA Notice 7210.360 involves a four-step screening process. Step 1 compares the minimum number of average daily large jet operations[4] on each track with an altitude-based threshold number to determine whether further review is needed. Next, Step 2 considers the proximity of new or changed jet tracks/routes to existing tracks/routes. In Step 3, the change in operations (action versus no action) is translated into approximate decibel levels. For cases where changes or additions result in a 5 dB DNL or greater increase over the no change scenario, Step 4 is applied to determine whether the potential increase is significant based on the land use. If so, further investigation including an EA may be indicated.

4. Step 1, Does the proposed action introduce noise exposure from large jet airplanes which may require further review of the noise impacts as defined in Table 1 of **N7210.360?** According to N7210.360, "The noise screening procedure for air traffic actions applies to *new* or *modified* arrival /departure procedures..." This indicates that only new or altered large jet tracks need be analyzed. The three new jet tracks proposed to serve Runway 14/32 are shown in Figure 1. No changes to existing jet tracks are proposed.

a. In Table 1A, the application of Step 1 to the new jet tracks reveals that five percent of the Stage 3 aircraft that will operate on either Track 14J1 (Runway 14 jet departures) or Tracks A321 and 32A2 (Runway 32 arrivals) for each altitude do not exceed the threshold limits established by N7210.360. As a result, no further analysis is required. Two of the new tracks are completely over water and no significant noise increase will result from their use. Track 32A1 is coincidental with the existing 33L right base pattern until below 3,000 feet where aircraft would transition to the Runway 32 final approach course. It is essentially an addition of traffic to an existing track and no significant increase in aircraft noise exposure will result as shown in Table 1 A. However, because changes in jet operations on other existing tracks may also result in changes in aircraft noise exposure, as in the case of Track 32A1, all jet tracks were analyzed for the LAIP build (Alternative 1A) and no-build (Alternative 4) cases.

b. Due to the number and proximity of tracks used at Logan, all aircraft tracks used by large jets of 75,000 lbs or more were identified and then organized into arrival and departure corridors. A total of 16 arrival and 13 departure corridors were defined (See Figures 2 - 5). Corridors were defined by grouping tracks by direction of flight. Typically, tracks within the same corridor were within 1 to 3 miles of each other. The minimum number of forecasted Stage 3 operations were compared to N7210.360 established threshold levels. This time, however, a comparison of traffic levels within each unique corridor was made rather than on only the two new tracks. The average number of daily Stage 3 operations for each track were estimated using INIVI input files developed for the LAIP EIS/ER. These figures were added for each group of tracks within a common corridor. Since all of these operations are Stage 3 aircraft, the effective number used for the screening procedure was taken as 5 percent of the total average daily operations for each corridor. The screening was completed for both LAIP Alternatives 1A and 4 (See Tables 1 B and 1 C).

c. It was found that in most cases, *existing* flight corridors had *fewer* operations in the build than in the no-build altemative. The only exception to this involved departure operations to the southwest (corridor DSW, primarily from Runway 27), and arrivals from the northwest (corridor ANW, landing on 32/33L). Only the departure operations were found to be above the established threshold levels. This finding led to the need to continue with Step 3 of the notice.

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4 The minimum average number of daily large jet operations is estimated using 5 percent of the daily average number of Stage 3 operations.

Table M Analysis of New Tracks For Runway 14/32

Application of Step 1, Table 1, FAA Notice 7210.360

Alternative 1A (build) with 45MH fleet

Departures									
Altitude (AGL)	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	18,000
7210.360 Threshold[1]	2	4	6	10	14	20	26	34	191
Trk 14J1- 5.0 % of 3 Average Daily Runway 14 Stage III Departures [2]	0	0	0	0	0	0	0	0	0

Arrivals						
Altitude (Feet AGL)	3,000	4,000	5,000	6,000	7,000	Since the estimated number of daily operations on the affected tracks are less than the thresholds, no further analysis is required.
7210.360 Threshold	65	116	198	305	455	
Trk 32A2: 5.0 % of 8 Average Daily Runway 32 Stage III Arrivals	0	0	0	0	0	
Trk 32A1: 5.0 % of 22 Average Daily Runway 32 Stage III Arrivals	1	1	1	1	1	

1 Represents the minimum number of daily operations by large airplanes required to increase noise levels by 5 dB DNL or more.

2 Average daily operations source: LAIP INIVI data files

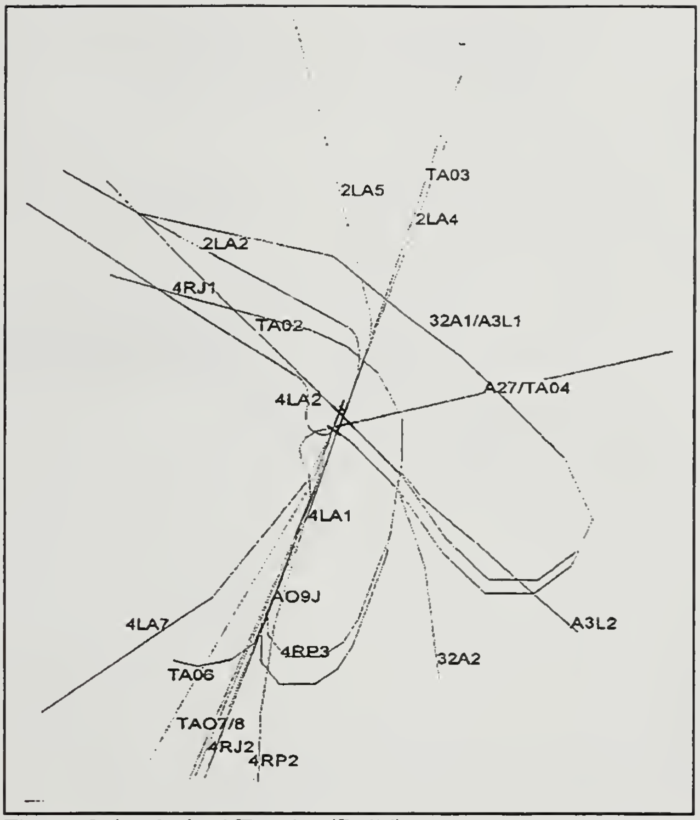


Figure 2 Jet Arrival Tracks (Build)

Figure 3 Jet Arrival Corridors (Build)

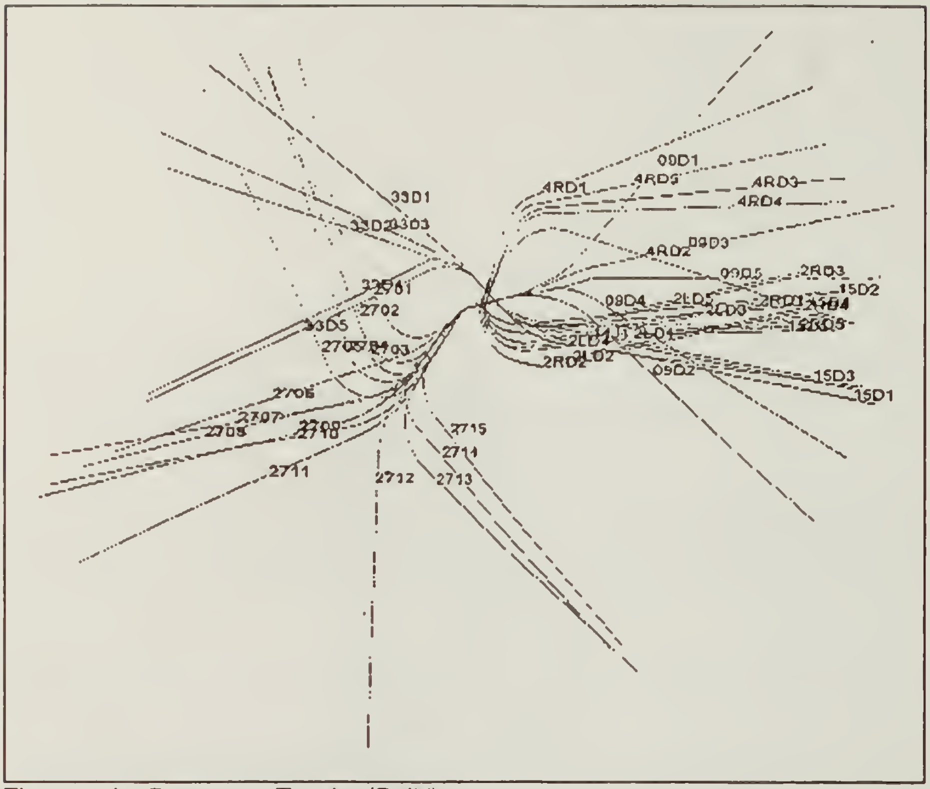


Figure 4 Jet Departure Tracks (Build)

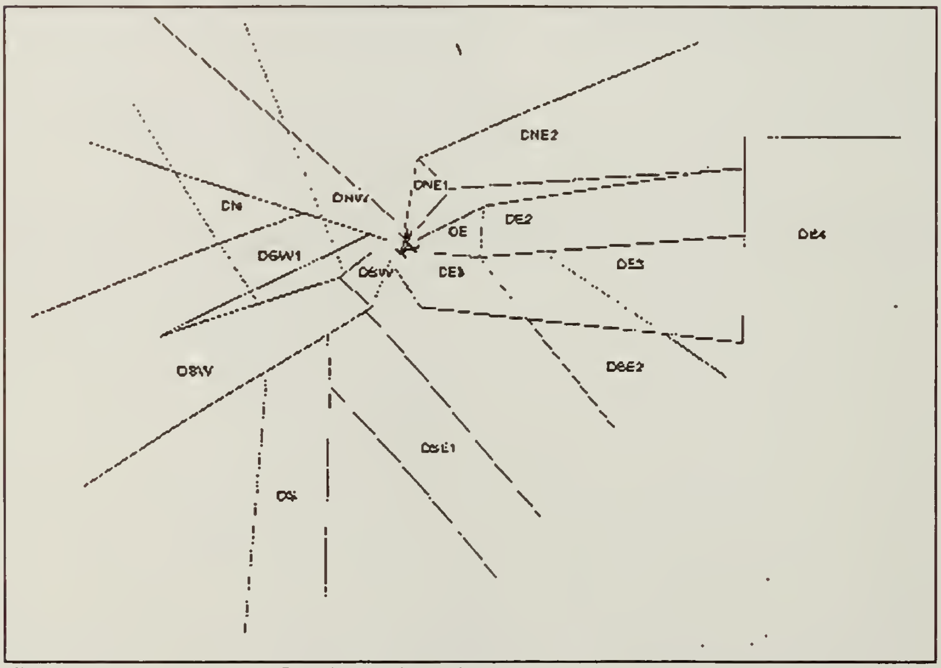


Figure 5 Jet Departure Corridors (Build)

Table 1B: Analysis of Flight Corridors

Application of Step 1, Table 1, FAA Notice 7210.360

Alternative 1A (build) with 45MH fleet

	Departures (5.0 % of Stage III Operations)									
	Altitude (AGL)	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	18,000
	7210.360 Threshold	2	4	6	10	14	20	26	34	191
Departure Corridors	DE	8	0	0	0	0	0	0	0	0
	DE2	0	8	8	0	0	0	0	0	0
	DE3	3	3	3	0	0	0	0	0	0
	DE4	0	0	0	11	11	11	11	11	11
	DN	0	2	2	2	2	2	2	2	2
	DNE1	3	0	0	0	0	0	0	0	0
	DNE2	0	3	3	0	0	0	0	0	0
	DNW	1	1	1	1	1	1	1	1	1
	DS	0	0	0	0	0	0	0	0	0
	DSE1	0	1	1	1	1	1	1	1	1
	DSE2	4	4	4	6	6	6	6	6	6
	DSW	7	3	3	4	4	4	4	4	4
	DSW1	1	1	1	1	1	1	1	1	1

	Arrivals (5.0% of Stage III Operations)					
	Altitude (Feet AGL)	3,000	4,000	5,000	6,000	7,000
	7210.360 Threshold	65	116	198	305	455
Arrival Corridors	33RB	5	0	0	0	0
	33RD	0	5	0	0	0
	4RB	8	0	0	0	0
	4RB2	0	0	0	0	0
	4RD	0	8	0	0	0
	AE	1	1	1	1	1
	AN	0	0	0	0	0
	ANE	2	2	2	2	2
	ANW	1	1	3	13	13
	AS	6	6	6	6	6
	ASE	4	4	4	4	4
	ASW	0	0	0	0	0
	AW	0	0	0	0	0

Shaded boxes indicate that the threshold has been exceeded and further analysis (Steps 2, 3, and/or 4 of the N7210.360 process) is necessary.

Table 1C: Analysis of Flight Corridors

Application of Step 1, Table 1, FAA Notice 7210.360

Alternative 4 (no-build) with 45MH fleet

Departures (5.0 % of Stage III Operations)

	Altitude (AGL)	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	18,000
	7210.360 Threshold	2	4	6	10	14	20	26	34	191
Departure Corridors	DE	9	0	0	0	0	0	0	0	0
	DE2	0	9	9	0	0	0	0	0	0
	DE3	9	9	9	0	0	0	0	0	0
	DE4	0	0	0	18	18	18 .	18	18	18
	DN	0	0	0	0	0	0	0	0	0
	DNE1	3	0	0	0	0	0	0	0	0
	DNE2	0	3	3	0	0	0	0	0	0
	DNW	0	0	0	0	0	0	0	0	0
	DS	0	0	0	0	0	0	0	0	0
	DSE1	0	0	0	0	0	0	0	0	0
	DSE2	4	4	4	7	7	7	7	7	7
	DSW	1	0	0	0	0	0	0	0	0
	DSW1	0	0	0	0	0	0	0	0	0

Arrivals (5.0% of Stage III Operations)

	Altitude (Feet AGL)	3,000	4,000	5,000	6,000	7,000
	7210.360 Threshold	65	116	198	305	455
Arrival Corridors	33RB	1	0	0	0	0
	33RD	0	1	0	0	0
	4RB	9	0	0	0	0
	4RB2	0	0	0	0	0
	4RD	0	9	0	0	0
	AE	6	6	6	6	6
	AN	0	0	0	0	0
	ANE	3	3	3	3	3
	ANW	0	0	10	10	10
	AS	8	8	8	8	8
	ASE	1	1	1	1	1
	ASW	0	0	0	0	0
	AW	0	0	0	0	0

Shaded boxes indicate that the threshold has been exceeded and further analysis (Steps 2, 3, and/or 4 of the N7210.360 process) is necessary

5. Step 2, Does this action introduce large jet airplanes over residential areas which are not routinely exposed to noise from large jet airplanes as defined in Table 2 of N7210.360? In both the build an no-build scenarios, departure operations were found to exceed the established thresholds. As a result, Step 2 of the process was applied. This involved comparing the proximity of new tracks to existing tracks at various altitudes (See Table 2). Since all of the new jet tracks were found to be within the "no change lateral minima" of existing tracks, the answer to the above question was no. This finding required application of Step 3.

Table 2: Analysis of New Tracks For Runway 14/32 Application of Step 2, Table 2, FAA N7210.360	
Aircraft Altitude (ft. AGL)	No Change Lateral Minima (nm)
3,000 - 6,000	**1**
6,000 - 12,000	**2**
above 12,000	3

6. Step 3, In the case of a proposed action which only changes the aircraft altitudes andlor numbers of daily operations of large jet airplanes on an existing route or track will these changes result in a 5 decibel increase in aircraft noise as defined in Table 3 of N7210.360? Although Step 2 resulted in the finding that no additional residential areas would be subject to overflights by large jets, it is apparent that the introduction of Runway 14/32 would allow an increase in the number of operations on specific existing routes. Currently, jet operations using Runway 33L arrive from the northwest (down wind leg 33L) or from the southeast over water (straight-in approach). All jet departures to the east/southeast (Runways 9 and 15R) are over water. Given unidirectional operation, these are the same routes that would be used by Runway 14/32 operations. Step 3 examines the percentage change in the number of operations on existing routes between the action vs no action cases (build over no-build) to determine if an increase of 5 dB DNL or greater may result. The percentage change values were determined for each corridor and compared to the values given in the FAA notice (see Table 3). Table 3 in the FAA notice associates percentage increases or decreases in operations with a dB level. Nearly half of the percentage changes were decreases in the noise levels of existing corridors when compared to the No Build scenario. Of the increases, only one departure and three arrival corridors were identified. These included departures to the southwest (Corridor DSW, primarily departures from Runway 27), arrivals from northwest (Corridors 33RB and 33RD aircraft from the northwest arriving over water via a right-downwind to 32/33L), and arrivals from the southeast (32/33L arrivals over water). This finding required application of the fourth and final step in the N7210.360 screening process.

Table 3: Comparison of Operations Build vs No-Build by Corridors

Application of Step 3, Table 3 FAA Notice 7210.360 (5.0 % of Stage III Operations by Corridor)

Departures

Corridor	No-Build	Build	Operations Change	Altitude Change	Change in Noise Exposure
DE	9	8	-11%	0%	0
DE2	9	8	-11%	0%	0
DE3	9	3	-67%	0%	-5
DE4	18	11	-39%	0%	-2
DN	0	2	100%	0%	3
DNE1	3	3	0%	0%	0
DNE2	3	3	0%	0%	0
DNW	0	1	100%	0%	3
IDS	0	0	0%	0%	3
DSE1	0	1	100%	0%	0
IDSE2	7	6	-14%	0%	3
DSW	1	7	600%	0%	>8
DSW1	0	1	100%	0%	3

Arrivals

Corridor	No-Build	Build	Operations Change	Altitude Change	Change in Noise Exposure
33RB	1	5	400%	0%	>8
33RD	1	5	400%	0%	>8
4RI3	9	8	-11%	0%	0
4RB2	0	0	0%	0%	0
4RD	9	8	-11%	0%	0
AE	6	1	-83%	0%	-8
AN	0	0	0%	0%	0
ANE	3	2	-33%	0%	-2
ANW	10	13	30%	0%	1
AS	8	6	-25%	0%	-2
ASE	1	4	300%	0%	>8
ASW	0	0	0%	0%	0
AW	0	0	0%	0%	0

Shaded areas indicate possibly significant increases in noise levels and require application of Step 4 of the 7210.360 process.

6. Step 4, Taking into account the type of residential community, will the noise from large jet airplanes result in a 5 decibel increase to <u>the overall noise</u> exposures as defined in Table 4 of N7210.360? Since increases in aircraft noise exposure of 5 dB DNL or more were discovered, Step 4 was applied. In addition to the baseline threshold levels provided in the FAA notice additional levels are provided for overflights given various land-use types. In Step 1 of the analysis, only thresholds for the baseline "Quiet Suburb" land use category was considered. The "Quiet Suburb" consists of residential communities where the primary land use is considered to be single family detached dwellings on large lots. Step 4 introduces additional categories including "Normal Suburb" which consists of single family detached dwellings on 1/4 to 1/3 acre lots; "Urban" and "Noisy Urban." No arrival operations exceeded the thresholds for the Quiet Suburb classification and so further analysis was not required. A few departure operations exceeded the Quiet Suburb threshold (see Table 4). Primarily departures to the southwest (the initial departure from runway 27) were involved. Since these tracks are over areas that may be defined as Urban or Noisy Urban, and operations did not exceed the thresholds for Normal Suburb areas, further action was not indicated. This final step concluded the N7210.360 screening process.

Table 4: Analysis of Minimum Number of Daily Large Jet Departure Operations within the Affected Corridor

Application of Step 4, Table 4, FAA Notice 7210.360

Aircraft Altitude (ft. AGL)	Jet Departures using Corridor DSW		Residential Community (see below)			
	Build	No Build	Quiet Suburb	Normal Suburb	Urban	Noisy Urban
3,000	7	1	2	7	22	68
4,000	3	0	4	12	38	119
5,000	3	0	6	20	63	198
6,000	4	0	10	30	95	300
7,000	4	0	14	44	139	438
8,000	4	0	20	62	195	
9,000	4	0	26	83	262	
10,000	4	0	34	109	343	
11,000	4	0	45	142	450	
12,000	4	0	65	205		
13,000	4	0	72	229		
14,000	4	0	89	282		
15,000	4	0	109	343	> 500	
16,000	4	0	130	412		
17,000	4	0	159			
18,000	4	0	191			

Residential Community	Description
Quiet Suburb	Single family detached dwellings on large lots
Normal Suburb	Single family detached dwellings on 1/4 to 1/3 acre lots
Urban	Multi-family dwellings (apartment buildings, row housing, etc.)
Noisy Urban	Multi-family dwellings (high-rise apartments) near busy roads or industrial areas

7. Conclusion

Application of FAA Notice 7210.36 to the Logan Airside Improvements, including unidirectional Runway 14/32, concludes that further noise review is not necessary based on the noise screening procedure for certain air traffic actions above 3,000 feet AGL. The 7210.360 checklist is attached to this memo.

Noise Screening Procedure for Certain Air Traffic Actions Above 3,000 lost AGL

Checklist

Application

The screening procedure applies to new or modified arrival/departure procedures and new or modified airways which meet the following conditions:

(Check appropriate boxes)

- Involves airports with more than 1,500 large jet airplane (greater than 75,000 lbs.) operations per year, either current or projected whichever is most appropriate .... ☒

  and

- Represents a permanent change or planned test .... ☒

  and

- Concerns changes to departure routes or tracks, used by large jet airplanes, between 3,000 and 18,000 feet AGL/

  or

- Changes to arrival routes or tracks, used by large jet airplanes, between 3,000 and 7,000 feet AGL .... ☒

(If at lease 3 boxes have been checked, proceed to screening procedure.)

Noise Screening Procedure

STEP 1. Does the proposed action introduce noise exposure from large jet airplanes (>75,000 lbs.) which may require further review of the noise impacts as defined in Table 1 (see page 7)?

(Check appropriate boxes)

- If the estimated number of daily operations on the affected route are greater than the minimum, the answer is YES and proceed to STEP 2 to answer whether the proposed action introduces jet aircraft noise for the first time on a routine basis.

- If the estimated number of daily operations on the affected route are less than the minimum, the answer is NO and further noise review is NOT necessary. Refer to FAA Order 1050.1D for guidance on the extraordinary factors to consider. .... ☐

STEP 2. Does this action introduce large jet airplanes over residential areas which are not routinely exposed to jet aircraft noise as defined in Table 2 (see page 8)?

(Check appropriate boxes)

- If the location of any existing route or track is at least 3 n. mi. from the new route or track, the answer is YES and proceed to STEP 4 to determine the need for further action .... ☐

- If the new or moved route or track lies within the No Change lateral minimum of an existing route or track, the answer is NO and proceed to STEP 3 to determine whether the action will cause a 5 decibel increase in existing aircraft noise exposure. .... ☒

- If the new or moved route or track lies outside the NO Change lateral minimum of an existing route, the answer is YES and proceed to STEP 4 to determine whether the action represents a 5 decibel increase in the overall noise exposure. .... ☐

STEP 3. In the case of a proposed action which only changes the aircraft altitudes and/or numbers of daily operations of large jet airplanes on an existing route, will these changes result in a 5 decibel increase in aircraft noise exposure as defined in Table 3 (see page 9)?

(Check appropriate boxes)

- If the change in aircraft noise exposure is equal to or greater than 5 decibels, the answer is YES and proceed to STEP 4 to determine whether the change in aircraft noise exposure is also a 5 decibel increase in the overall noise exposure. ☒
- If the change in aircraft noise exposure is less than 5 dB, the answer is NO, and further noise review is NOT necessary. Refer to FAA Order 1050.1D for guidance on the extraordinary factors to consider. ☐

STEP 4. Taking into account the type of residential community, will the noise from large jet airplanes result in a 5 decibel increase in the overall noise exposure as defined in Table 4 (see page 10)?

(Check appropriate boxes)

- If the estimated number of daily operations on the affected route are greater than the minimum, the answer is YES, consult with the appropriate policy offices and the Regional Assistance Chief Counsel, and refer to FAA Order 1050.1D for guidance or additional procedures to use in considering the environmental consequences ☐
- If the estimated number of daily operations on the affected route are less than the minimum, the answer is NO and further noise review is NOT necessary. Refer to FAA Order 1050.1D for guidance on the extraordinary factors to consider. ☒

Further Environmental Review

STEP 4 was the last step of the noise screening procedure. In reaching this point, the screening procedure has established that the proposed action may cause at least a 5 decibel increase in the overall noise exposure. This information becomes one factor in the determination as to whether the action is likely to be highly controversial and therefore not eligible for a categorical exclusion.

(Check appropriate boxes)

- Refer to FAA Order 1050.1D for guidance on additional factors to consider and the procedure to follow ☐
- Consult with the appropriate policy offices and the Regional Assistant Chief Counsel to determine the applicability of the pertinent sections of Order 1050.1D dealing with environmental assessments ☐
- If the screening procedure predicts a 5 decibel increase in the overall noise exposure, out the decision has been made not to do an environmental assessment, prepare supporting Record of Decision ☐

2015 Noise Results

APPENDIX E -- NOISE

Supplemental Results of 2015 High Regional Jet Fleet Analyses

Tables E-1 through E-5 below provide data for each of the study alternatives examined as part of the analysis of the 2015 High Regional Jet Fleet. Except for the Time-Above-Threshold calculations, the tables duplicate the results for the No-Action and Preferred Alternatives (4 and 1A) that were presented in the body of the text but provide the additional information on Alternatives 1 and 2/3 for the first time here. In the case of the Time-Above calculations, results for ALL alternatives are reported here in the Appendix.

Table E.1
INM-Computed Day-Night Sound Levels at Specific Points for 1998 and for All Study Alternatives — 2015 High Regional Jet Fleet

Noise Monitor	Location	1998 Existing Fleet	Alternative 4 No Action	Alternative 1A Full Build Without Peak Period Pricing	Alternative 1 Full Build With Peak Period Pricing	Alternatives 2/3 Other Improvements
1	Andrews Street, South End	58.7	51.5	56.0	55.6	51.1
2	B & Bolton, South Boston	66.7	58.1	63.0	62.6	57.7
3	South Boston Yacht Club, South Boston	64.5	68.4	66.6	65.6	67.6
4	Bayview & Grandview, Winthrop	79.4	75.9	73.9	73.8	75.4
5	Harborview & Faun Bar, Winthrop	71.4	68.1	66.6	66.0	67.4
6	Somerset & Johnson, Winthrop	68.2	64.7	64.7	64.5	64.7
7	Loring Road Near Court Road, Winthrop	76.1	75.9	73.5	73.5	75.9
8	Morton & Amelia, Winthrop	67.5	66.0	64.7	64.5	66.2
9	Bayswater & Nancia, East Boston	72.4	73.0	71.5	71.2	73.1
10	Bayswater & Shawsheen, East Boston	66.3	65.6	64.3	64.2	65.8
11	Don Orione, East Boston	62.2	60.4	59.3	59.1	60.6
12	East Boston Yacht Club, East Boston	74.0	70.2	68.2	68.2	70.1
13	East Boston High School, East Boston	64.2	60.4	64.9	65.2	60.2
A	Sumner near Lamson, East Boston	N/a	58.8	59.1	59.0	58.4
14	Jeffries Point Yacht Club, East Boston	64.9	60.8	60.9	60.6	60.4
15	Admiral's Hill, Chelsea	61.1	58.4	63.0	63.2	58.2
16	Bradstreet Avenue & Sales, Revere	69.0	72.8	71.1	70.7	72.8
17	Carey Circle, Revere	58.3	62.4	60.7	60.4	62.5
23	Myrtlebank/Hiltop, Dorchester	52.0	56.5	54.9	54.4	56.0
24	Cunningham Park, Milton	51.9	54.6	53.2	52.9	54.3
25	Squaw Rock Park, Quincy	51.2	49.9	48.4	48.2	49.6
26	Hull High School, Hull	58.1	53.3	55.7	55.6	53.2
E	Farragut @ 2nd, South Boston	N/a	68.1	66.3	65.2	67.2

Table E.2
INM-Computed Nighttime Equivalent Sound Levels at Specific Points for All Study Alternatives – 2015 High Regional Jet Fleet

Noise Monitor	Location	Alternative 4 No Action	Alternative 1A Full Build Without Peak Period Pricing	Alternative 1 Full Build With Peak Period Pricing	Alternatives 2/3 Other Improvements
1	Andrews Street South End	44.6	48.2	44.0	47.6
2	B & Bolton, South Boston	51.4	55.4	50.9	55.0
3	South Boston Yacht Club, South Boston	60.9	58.6	59.8	57.4
4	Bayview & Grandview, Winthrop	68.4	66.5	67.9	66.4
5	Harborview & Faun Bar, Winthrop	60.8	59.1	60.1	58.6
6	Somerset & Johnson, Winthrop	57.7	57.5	57.6	57.2
7	Loring Road Near Court Road, Winthrop	69.1	67.0	69.0	66.8
8	Morton & Amelia, Winthrop	59.1	58.0	59.2	57.5
9	Bayswater & Nancia, East Boston	66.2	64.9	66.2	64.4
10	Bayswater & Shawsheen, East Boston	58.6	57.5	58.7	57.1
11	Don Orione, East Boston	53.4	52.4	53.4	52.0
12	East Boston Yacht Club, East Boston	63.3	61.6	63.1	61.4
13	East Boston High School, East Boston	54.0	57.9	53.7	58.2
A	Sumner near Lamson, East Boston	51.9	52.0	51.5	51.9
14	Jeffries Point Yacht Club, East Boston	53.8	53.6	53.3	53.3
15	Admiral's Hill, Chelsea	52.1	56.2	51.8	56.4
16	Bradstreet Avenue & Sales, Revere	66.1	64.8	66.0	64.3
17	Carey Circle, Revere	49.1	47.2	48.4	46.7
23	Myrtlebank/Hiltop, Dorchester	47.3	45.6	46.9	45.3
24	Cunningham Park, Milton	42.7	41.2	42.4	40.9
25	Squaw Rock Park, Quincy	46.7	48.5	46.6	48.3
26	Hull High School, Hull	60.5	58.3	59.4	56.9
E	Farragut @ 2nd, South Boston	44.6	48.2	44.0	47.6

Table E-3
Comparison of Maximum Sound Levels (Lmax) for All Alternatives – 2015 High Regional Jet Fleet

Noise Monitor	Location	Alternative 4 No Action	Alternative 1A Full Build Without Peak Period Pricing	Alternative 1 Full Build With Peak Period Pricing	Alternatives 2/3 Other Improvements
1	Andrews Street, South End	84.5	84.5	84.5	84.5
2	B & Bolton, South Boston	93.0	93.0	93.0	93.0
3	South Boston Yacht Club, South Boston	91.8	91.8	91.8	91.8
4	Bayview & Grandview, Winthrop	101.4	101.4	101.4	101.4
5	Harborview & Faun Bar, Winthrop	93.3	93.3	93.3	93.3
6	Somerset & Johnson, Winthrop	81.9	81.9	81.9	81.9
7	Loring Road near Court Road, Winthrop	97.1	97.1	97.1	97.1
8	Morton & Amelia, Winthrop	97.3	97.3	97.3	97.3
9	Bayswater & Nancia, E. Boston	103.9	103.9	103.9	103.9
10	Bayswater & Shawsheen, East Boston	90.1	90.1	90.1	90.1
11	Don Orione, East Boston	83.8	83.8	83.8	83.8
12	East Boston Yacht Club, East Boston	85.8	85.8	85.8	85.8
13	East Boston High School, East Boston	97.0	97.0	97.0	97.0
A	Sumner near Lamson, East Boston	81.2	81.2	81.2	81.2
14	Jeffries Point Yacht Club, East Boston	82.3	82.3	82.3	82.3
15	Admiral's Hill, Chelsea	96.4	96.4	96.4	96.4
16	Bradstreet Avenue & Sales, Revere	97.7	97.7	97.7	97.7
17	Carey Circle, Revere	87.1	87.1	87.1	87.1
23	Myrtlebank/Hiltop, Dorchester	79.7	79.7	79.7	79.7
24	Cunningham Park, Milton	75.8	75.8	75.8	75.8
25	Squaw Rock Park, Quincy	73.5	73.5	73.5	73.5
26	Hull High School, Hull	81.0	81.0	81.0	81.0
E	Farragut @ 2nd, South Boston	91.9	91.9	91.9	91.9

Table E-4
Calculated Time-Above-Threshold Values for a 24-Hour Period — 2015 High Regional jet Fleet (Units are Minutes Per Day Above Specified Sound Levels)

Noise Monitor	Location	Alternative 4 No Action			Alternative 1A Full Build Without Peak Period Pricing			Alternative 1 Full Build With Peak Period Pricing			Alternatives 2/3 Other Improvements		
		85 dB	75 dB	65 dB	85 dB	75 dB	65 dB	85 dB	75 dB	65 dB	85 dB	75 dB	65 dB
1	Andrews St, South End	0.0	0.1	4.2	0.0	0.5	18.8	0.0	0.5	18.5	0.0	0.1	4.0
2	B & Bolton, South Boston	0.0	1.4	9.8	0.1	8.1	44.5	0.1	8.1	43.1	0.0	1.4	9.3
3	South Boston Yacht Club, South Boston	2.5	20.4	90.3	1.9	15.4	68.2	1.4	12.7	61.3	2.1	18.2	85.9
4	Bayview & Grandview, Winthrop	14.4	66.0	151.0	9.3	46.5	119.8	8.6	42.1	109.5	13.1	60.4	137.9
5	Harborview & Faun Bar, Winthrop	0.6	26.5	116.4	0.5	20.5	86.6	0.4	17.4	78.1	0.6	23.3	106.5
6	Somerset & Johnson, Winthrop	0.0	5.0	86.0	0.0	3.8	109.4	0.0	4.5	110.6	0.0	6.0	88.3
7	Loring Road near Court Road, Winthrop	11.5	50.3	250.0	4.9	23.6	113.6	5.8	27.5	127.5	12.3	55.1	261.1
8	Morton & Amelia, Winthrop	0.5	8.2	74.6	0.4	5.9	37.7	0.4	7.2	43.0	0.5	10.6	82.5
9	Bayswater & Nancia, East Boston	6.7	37.3	120.0	3.9	19.6	62.6	4.4	22.1	68.3	7.5	41.4	128.0
10	Bayswater & Shawsheen, East Boston	0.2	11.4	69.4	0.2	7.6	43.2	0.2	8.7	46.6	0.2	13.7	75.9
11	Don Orione, East Boston	0.0	1.8	34.5	0.0	1.4	22.8	0.0	1.4	24.7	0.0	2.0	38.7
12	East Boston Yacht Club, East Boston	0.1	36.7	230.2	0.1	16.4	120.9	0.1	18.6	133.9	0.1	37.8	235.4
13	East Boston High School, East Boston	0.1	1.6	6.2	0.5	8.9	32.2	0.5	9.5	34.6	0.1	1.5	5.7
A	Sumner near Lamson, East Boston	0.0	0.0	13.7	0.0	0.0	19.2	0.0	0.0	18.4	0.0	0.0	12.0
14	Jeffries Point Yacht Club, E.ast Boston	0.0	0.0	35.0	0.0	0.1	44.7	0.0	0.1	41.9	0.0	0.0	31.5
15	Admiral's Hill, Chelsea	0.1	1.0	5.5	0.3	4.7	23.9	0.3	4.9	26.0	0.1	1.0	5.1
16	Bradstreet Avenue & Sales, Revere	6.2	26.9	59.8	3.0	14.0	32.2	3.2	15.7	35.4	6.5	29.5	65.8
17	Carey Circle, Revere	0.0	6.3	38.6	0.0	3.1	19.6	0.0	3.3	22.1	0.0	6.6	42.3
23	Myrtlebank/Hiltop, Dorchester	0.0	0.0	16.5	0.0	0.0	12.6	0.0	0.0	11.2	0.0	0.0	15.5
24	Cunningham Park, Milton	0.0	0.0	14.0	0.0	0.0	10.9	0.0	0.0	10.4	0.0	0.0	14.0
25	Squaw Rock Park, Quincy	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2
26	Hull High School, Hull	0.0	0.0	4.3	0.0	0.0	15.8	0.0	0.0	15.8	0.0	0.0	4.3
E	Farragut @ 2nd, South Boston	2.6	16.3	82.1	1.9	12.1	62.5	1.5	9.6	55.9	2.2	14.1	77.1

Table E-5
Calculated Time-Above-Threshold Values for Nighttime Hours (10:00 PM to 7:00 AM) -- 2015 High Regional Jet Fleet
(Units are Minutes Per Day Above Specified Sound Levels)

Noise Monitor	Location	Alternative 4 No Action			Alternative 1A Full Build Without Peak Period Pricing			Alternative 1 Full Build With Peak Period Pricing			Alternatives 2/3 Other Improvements		
		85 dB	75 dB	65 dB	85 dB	75 dB	65 dB	85 dB	75 dB	65 dB	85 dB	75 dB	65 dB
1	Andrews St, South End	0.0	0.0	0.9	0.0	0.1	15.0	0.0	0.1	1.9	0.0	0.0	0.8
2	B & Bolton, South Boston	0.0	0.4	2.1	0.1	0.9	1.9	0.1	0.9	4.0	0.0	0.3	1.7
3	South Boston Yacht Club, South Boston	0.4	3.2	15.7	0.1	1.4	4.0	0.1	1.4	8.9	0.3	2.5	13.6
4	Bayview & Grandview, Winthrop	2.3	9.6	23.1	1.3	5.4	8.9	1.3	5.4	15.0	2.0	8.2	19.9
5	Harborview & Faun Bar, Winthrop	0.2	4.2	17.5	0.1	2.4	15.0	0.1	2.4	10.5	0.2	3.5	15.1
6	Somerset & Johnson, Winthrop	0.0	1.6	17.9	0.0	1.5	10.5	0.0	1.5	16.7	0.0	1.7	16.7
7	Loring Road near Court Road, Winthrop	2.6	11.6	49.8	1.5	6.9	16.7	1.5	6.9	29.0	2.5	11.3	46.8
8	Morton & Amelia, Winthrop	0.2	1.8	16.9	0.1	1.3	29.0	0.1	1.3	10.9	0.2	2.0	16.7
9	Bayswater & Nancia, East Boston	1.7	8.5	24.6	1.1	5.4	10.9	1.1	5.4	15.6	1.7	8.4	23.6
10	Bayswater & Shawsheen, East Boston	0.1	2.3	14.5	0.1	1.5	15.6	0.1	1.5	10.4	0.1	2.4	14.2
11	Don Orione, East Boston	0.0	0.4	6.6	0.0	0.3	10.4	0.0	0.3	4.7	0.0	0.4	6.6
12	East Boston Yacht Club, East Boston	0.1	8.7	45.2	0.1	5.5	4.7	0.1	5.5	29.9	0.1	8.3	42.3
13	East Boston High School, East Boston	0.1	0.4	2.0	0.2	1.4	29.9	0.2	1.4	5.1	0.1	0.4	1.9
A	Sumner near Lamson, East Boston	0.0	0.0	5.2	0.0	0.1	5.1	0.0	0.0	5.7	0.0	0.0	4.9
14	Jeffries Point Yacht Club, E.ast Boston	0.0	0.0	9.1	0.1	0.8	8.4	0.0	0.1	8.4	0.0	0.0	8.1
15	Admiral's Hill, Chelsea	0.0	0.3	1.2	1.2	4.3	3.6	0.1	0.8	3.6	0.0	0.3	1.2
16	Bradstreet Avenue & Sales, Revere	1.8	6.6	14.4	0.0	1.2	9.4	1.2	4.3	9.4	1.8	6.5	14.2
17	Carey Circle, Revere	0.0	1.9	9.7	0.0	0.0	1.6	0.0	1.2	6.3	0.0	1.8	9.5
23	Myrtlebank/Hiltop, Dorchester	0.0	0.0	2.9	0.0	0.0	1.7	0.0	0.0	1.6	0.0	0.0	2.5
24	Cunningham Park, Milton	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	2.4
25	Squaw Rock Park, Quincy	0.0	0.0	0.1	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.1
26	Hull High School, Hull	0.0	0.0	1.6	0.0	0.0	5.7	0.0	0.0	3.0	0.0	0.0	1.6
E	Farragut @ 2nd, South Boston	0.4	2.2	14.7	0.1	0.8	8.4	0.1	0.8	8.4	0.3	1.7	12.7

School Day Noise Contours for Preferred Alternative 1A -- 29 Million Low Fleet

Also supplementing the analyses included in this document is a depiction of the noise exposure extending over an 8-hour school day. The exposure levels reported here are comparable to the Nighttime Equivalent Sound Levels reported elsewhere in the Noise Sections of this document as Leq(N). In this case, however, the period covered by the metric is an average weekday between 15 September and 15 June, covering the hours from 8:00 a.m. to 4:00 p.m. The metric is referred to as Leq(8). The contours shown in the accompanying Figure E-1 represent the exposure resulting from the operations projected to occur during this 8-hour period under the 29 Million Low Fleet and Preferred Alternative 1A with the new unidirectional Runway 14/32. The 29 Million Low Fleet was selected for this analysis because it represents the greatest degree of impact as measured by numbers of people exposed to DNL values greater than 65 dB.

The figure shows the Leq(8) noise contours at values of 60, 65, and 70 dB of exposure overlaid on a basemap showing local schools in the vicinity of Logan Airport. An Leq(8) of 60 dB represents the probable lower limit of any area where school sound insulation of an untreated building is likely to benefit. Though there is no firm standard which guides the sound insulation of classrooms, a normal goal for such programs is to design for at least 5 decibels of reduction and achieve an interior 8-hour equivalent sound level of no more than 45 decibels. With an outdoor Leq(8) of 60 dB (which would exist for any school located on the 60 dB contour in Figure E-1), achievement of an interior level of 45 dB requires only 15 decibels of noise reduction. That degree of reduction occurs in normal school construction, even with windows open.

Given that no schools fall within the 60 dB Leq(8) contour for the Preferred Alternative under the 29 Million Low Fleet, it is expected that no sound insulation of schools will be necessary.

Figure E-1 – 8-Hour Equivalent Sound Levels During an Average School Day for the 29M Low Fleet and Preferred Alternative 1A

Comparison of Noise Results for all Alternatives
Excerpted from the Draft EIS/EIR

Excerpt from the Airside Draft EIS/EIR
Noise Results

Table 6.2-1
1999 and 2010 Logan Average Daily Operations—Without Peak Period Pricing (Alternatives 1A and 4)

	Stage 2 Aircraft		Stage 3 Aircraft		Turboprop Aircraft		Totals	
Fleet Forecast	Day	Night	Day	Night	Day	Night	Day	Night
1999 - 29M Low	16	5	715	90	562	10	1292	105
1999 - 29M High[(1)]	20	2	724	60	653	54	1396	115
2010 - 37.5M Low	0	0	814	102	562	11	1376	113
2010 - 37.5 High	0	0	877	118	658	13	1534	130
2010 - 45M High	0	0	954	126	707	13	1660	139

Note: "Day" defined as 7:00 AM to 9:59 PM and "Night" defined as 10:00 PM to 6:59 AM.

(1) The 1999 29M High Fleet forecast reflects a greater proportion of turboprop aircraft in both day and night than do the other four fleets.

Table 6.2-2
1999 and 2010 Logan Average Daily Operations—With Peak Period Pricing (Alternatives 1, 2 and 3)

	Stage 2 Aircraft		Stage 3 Aircraft		Turboprop Aircraft		Totals	
Fleet Forecast	Day	Night	Day	Night	Day	Night	Day	Night
1999 - 29M Low	16	5	715	90	551	10	1282	105
1999 - 29M High	20	2	724	60	591	54	1334	115
2010 - 37.5M Low	0	0	814	102	543	11	1358	113
2010 - 37.5M High	0	0	877	118	504	13	1580	130
2010 - 45M High	0	0	954	125	536	13	1490	138

Note: "Day" defined as 7:00 AM to 9:59 PM and "Night" defined as 10:00 PM to 6:59 AM.

Table 6.2-3
Effective Arrivals by Fleet and Runway End

	Percent Effective Arrivals by Fleet			
	1993	1999 - 29M	2010 - 37.5M	
Runway End and Improvement Concept	Base	Low	Low	High
Runway 4L/R				
PRAS Goal	**21.1**	**21.1**	**21.1**	**21.1**
Alternative 1 - All Actions	--	24.6	33.4	30.0
Alternative 1A - All Except Peak Period Pricing	--	24.6	34.0	29.7
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	34.1	41.2	45.4
Alternative 4 - No Action	35.8	34.8	42.3	47.3
Runway 15L/R				
PRAS GOAL	**8.4**	**8.4**	**8.4**	**8.4**
Alternative 1 - All Actions	--	7.7	6.1	6.0
Alternative 1A - All Except Peak Period Pricing	--	7.7	6.0	4.1
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	4.1	1.8	2.1
Alternative 4 - No Action	3.7	4.9	1.4	1.2
Runway 22L/R				
PRAS Goal	**6.5**	**6.5**	**6.5**	**6.5**
Alternative 1 - All Actions	--	12.2	14.0	12.0
Alternative 1A - All Except Peak Period Pricing	--	12.3	14.1	16.1
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	12.1	15.2	13.9
Alternative 4 - No Action	11.7	12.4	16.0	21.6
Runway 27				
PRAS Goal	**21.7**	**21.7**	**21.7**	**21.7**
Alternative 1 - All Actions	--	18.6	12.9	16.0
Alternative 1A - All Except Peak Period Pricing	--	18.6	12.7	13.1
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	14.6	16.2	23.7
Alternative 4 - No Action	16.9	14.6	16.4	15.7
Runways 33L and 32				
PRAS Goal	**42.3**	**42.3**	**42.3**	**42.3**
Alternative 1 - All Actions	--	36.8	33.6	35.9
Alternative 1A - All Except Peak Period Pricing	--	36.8	33.2	37.0
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	35.0	25.5	14.9
Alternative 4 - No Action	31.8	33.2	23.7	14.2

Table 6.2-4
Effective Departures By Fleet and Runway End

	Percent Effective Departures by Fleet			
	1993	1999 - 29M	2010 - 37.5M	
Runway End and Improvement Concept	Base	Low	Low	High
Runway 4L/R				
PRAS Goal	**5.6**	**5.6**	**5.6**	**5.6**
Alternative 1 - All Actions	--	7.6	7.1	11.1
Alternative 1A - All Except Peak Period Pricing	--	7.8	7.1	6.7
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	7.0	6.6	13.9
Alternative 4 - No Action	10.3	7.7	6.9	7.7
Runway 15L/R and 14				
PRAS Goal	**23.3**	**23.3**	**23.3**	**23.3**
Alternative 1 - All Actions	--	18.1	14.1	11.6
Alternative 1A - All Except Peak Period Pricing	--	18.0	14.1	14.6
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	13.0	9.9	9.5
Alternative 4 - No Action	12.9	12.5	9.3	12.2
Runway 22L/R				
PRAS Goal	**28.0**	**28.0**	**28.0**	**28.0**
Alternative 1 - All Actions	--	26.9	22.7	24.8
Alternative 1A - All Except Peak Period Pricing	--	27.0	22.8	25.1
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	26.1	31.0	37.3
Alternative 4 - No Action	27.5	26.3	32.0	33.4
Runway 27				
PRAS Goal	**17.9**	**17.9**	**17.9**	**17.9**
Alternative 1 - All Actions	--	17.0	16.5	17.1
Alternative 1A - All Except Peak Period Pricing	--	16.9	16.5	20.5
Alternative 2/3 - All Except Runway 14/32 and No Build	--	15.2	8.6	5.4
Alternative 4 - No Action	12.3	14.1	7.8	5.5
Runway 33L/R				
PRAS Goal	**11.9**	**11.9**	**11.9**	**11.9**
Alternative 1 - All Actions	--	12.0	10.8	9.8
Alternative 1A - All Except Peak Period Pricing	--	12.0	10.7	9.9
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	11.5	9.5	1.7
Alternative 4 - No Action	11.7	11.1	9.1	3.0
Runway 9				
PRAS Goal	**13.3**	13.3	**13.3**	**13.3**
Alternative 1 - All Actions	--	18.5	28.7	25.7
Alternative 1A - All Except Peak Period Pricing	--	18.4	28.7	23.1
Alternatives 2/3 - All Except Runway 14/32 and No Build	--	27.3	34.3	32.3
Alternative 4 - No Action	25.2	28.3	35.0	38.2

Table 6.2-5
Achievement of Annual PRAS Runway Use Goals

	Variance from Annual PRAS Goals by Fleet[1]			
	1993	1999 - 29M	2010 - 37.5M	
Improvement Concept	Base	Low	Low	High
Perfect PRAS Compliance	0.0	0.0	0.0	0.0
Alternative 1 - All Actions	N/A	33.2	73.5	64.8
Alternative 1A - All Except Peak Period Pricing	N/A	33.4	74.8	63.6
Alternatives 2 and 3 - All Except Runway 14/32 and No Build	N/A	68.1	107.8	140.5
Alternative 4 - No Action	73.3	73.4	115.5	147.5

(1) Variance from PRAS Goals is measured as the sum of absolute deviations from PRAS Goals. An improvement in PRAS compliance is measured as a decline in the sum of absolute percentage deviations. Zero represents perfect PRAS compliance.

Table 6.2-6
Population Summary

Day-Night Sound Level in dB	1993	All Actions Alternative 1	All Except Peak Period Pricing Alternative 1A	All Except Runway 14/32 and No Build Alternatives 2 and 3	No Action Alternative 4
1999 - 29M Low Fleet					
Greater or equal to 75 dB	568	77	77	222	257
Greater or equal to 70 dB	6,380	1,382	1,459	1,445	1,521
Greater or equal to 65 dB	34,386	17,677	17,909	16,892	17,531
2010 - 37.5M Low Fleet					
Greater or equal to 75 dB	568	0	58	58	135
Greater or equal to 70 dB	6,380	670	730	1,676	2,208
Greater or equal to 65 dB	34,386	10,481	10,481	10,239	10,450
2010 - 37.5M High Fleet					
Greater or equal to 75 dB	568	58	58	257	257
Greater or equal to 70 dB	6,380	1,213	1,028	3,321	3,828
Greater or equal to 65 dB	34,386	13,351	12,007	11,548	11,499

1. Estimated cumulative numbers of people living in areas where the noise from aircraft flight operations equals or exceeds the indicated value of the annual average Day-Night Sound Level.
2. All estimates are based on runway use chosen to most nearly meet PRAS goals and reflect the effects of delayed aircraft as determined by the DELAYSIM model.

Table 6.2-7
Comparison of the Noise-exposed Population for Alternatives 1, 1a, 2 and 3 to the No Action Alternative

	Percent Difference Compared to No Action (Alternative 4)		
Day-Night Sound Level in dB	**Alternative 1**	**Alternative 1A**	**Alternatives 2 and 3**
1999 - 29M Low Fleet			
Greater or equal to 75 dB	-70%	-70%	-14%
Greater or equal to 70 dB	-9%	-4%	-5%
Greater or equal to 65 dB	1%	2%	-4%
2010 - 37.5M Low Fleet			
Greater or equal to 75 dB	-100%	-57%	-57%
Greater or equal to 70 dB	-70%	-67%	-24%
Greater or equal to 65 dB	0%	0%	-2%
2010 - 37.5M High Fleet			
Greater or equal to 75 dB	-77%	-77%	0%
Greater or equal to 70 dB	-68%	-73%	-13%
Greater or equal to 65 dB	16%	4%	0%

1. Percentage reductions in estimated cumulative numbers of people living in areas where the noise of aircraft flight operations equals or exceeds the indicated value of the annual average day-night sound level.
2. All estimates are based on runway use chosen to most nearly meet PRAS goals.

Table 6.2-8
Cumulative Population Summary by Town or Neighborhood Area 1999 – 29M Low Fleet

Town	Interval	1993 Actual Fleet	Alternative 1 Full Build With Peak Period Pricing	Alternative 1A Full Build Without Peak Period Pricing	Alternatives 2 and 3 Without Runway 14/32 and No Build	Alternative 4 No Action
Chelsea	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	6,140	3,171	3,300	2,900	3,056
East Boston - Eagle Hill	75 dB & more	0	0	0	0	0
	70 dB & more	2,079	280	280	280	280
	65 dB & more	8,285	4,134	4,134	4,134	4,134
East Boston - Orient Heights/Bayswater	75 dB & more	58	0	0	58	58
	70 dB & more	402	58	118	118	157
	65 dB & more	2,439	751	751	612	612
Other East Boston	75 dB & more	0	0	0	0	0
	70 dB & more	341	0	0	0	0
	65 dB & more	3,940	2,371	2,371	2,371	2,371
Total East Boston(1)	75 dB & more	58	0	0	58	58
	70 dB & more	2,822	338	398	398	437
	65 dB & more	14,644	7,256	7,256	6,915	7,117
Revere	75 dB & more	0	0	0	0	0
	70 dB & more	1,335	0	0	0	0
	65 dB & more	4,679	2,896	2,999	2,999	3,001
South Boston - D Street Area(2)	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	1,043	98	98	66	66
Winthrop - Point Shirley	75 dB & more	353	77	77	164	199
	70 dB & more	1,305	656	673	825	862
	65 dB & more	2,195	1,649	1,649	1,863	1,924
Winthrop - Court Road	75 dB & more	157	0	0	0	0
	70 dB & more	815	388	388	222	222
	65 dB & more	3,387	1,763	1,763	1,369	1,523
Rest of Winthrop	75 dB & more	0	0	0	0	0
	70 dB & more	103	0	0	0	0
	65 dB & more	2,298	844	844	780	844
Total Winthrop	75 dB & more	510	77	77	164	199
	70 dB & more	2,223	1,044	1,061	1,047	1,084
	65 dB & more	7,880	4,256	4,256	4,012	4,291
Totals - Population Summary	75 dB & more	568	77	77	222	257
	70 dB & more	6,380	1,382	1,459	1,445	1,521
	65 dB & more	34,386	17,677	17,909	16,892	17,531

(1) The population within the 65 dB contour for the Jeffries Point neighborhood is 0 for all alternatives.
(2) The only area of South Boston included within 65 dB is the D Street Area.
(3) Total counts do not include Deer Island or Long Island (institutional population only).

Table 6.2-9
Cumulative Population Summary by Town or Neighborhood Area 2010 - 37.5M Low Fleet

Town	Interval	1993 Actual Fleet	Alternative 1 Full Build With Peak Period Pricing	Alternative 1A Full Build Without Peak Period Pricing	Alternatives 2 and 3 Without Runway 14/32 and No Build	Alternative 4 No Action
Chelsea	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	6,140	1,807	1,807	0	0
East Boston - Eagle Hill	75 dB & more	0	0	0	0	0
	70 dB & more	2,079	0	0	0	0
	65 dB & more	8,265	2,079	2,079	618	1,406
East Boston - Orient Heights/Bayswater	75 dB & more	58	0	0	24	0
	70 dB & more	402	0	0	24	0
	65 dB & more	2,439	0	0	24	0
East Boston – Jeffries Point	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	0	2,371	2,371	2,371	2,371
Other East Boston	75 dB & more	0	0	0	0	0
	70 dB & more	341	0	0	0	0
	65 dB & more	3,940	716	716	641	1,394
Total East Boston	75 dB & more	58	0	58	58	58
	70 dB & more	2,822	58	118	157	157
	65 dB & more	14,644	3,197	3,197	3,412	3,412
Revere	75 dB & more	0	0	0	0	0
	70 dB & more	1,335	0	0	689	1,047
	65 dB & more	4,679	2,808	2,808	3,293	3,357
South Boston - D Street Area(1)	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	1,043	0	0	18	18
Winthrop - Point Shirley	75 dB & more	353	0	0	0	77
	70 dB & more	1,305	455	455	673	782
	65 dB & more	2,195	1,395	1,395	1,649	1,649
Winthrop - Court Road	75 dB & more	157	0	0	0	0
	70 dB & more	815	157	157	157	222
	65 dB & more	3,387	1,007	850	1,234	1,234
Rest of Winthrop	75 dB & more	0	0	0	0	0
	70 dB & more	103	0	0	0	0
	65 dB & more	2,298	267	267	253	780
Total Winthrop	75 dB & more	510	77	77	164	199
	70 dB & more	2,223	1,044	1,061	1,047	1,084
	65 dB & more	7,880	4,256	4,256	4,012	4,291
Totals - Population Summary	75 dB & more	568	0	58	58	135
	70 dB & more	6,380	670	730	1,676	2,208
	65 dB & more	34,386	10,481	10,481	10,239	10,450

(1) The only area of South Boston included with 65 dB is the D Street Area.
(2) Total counts do not include Deer Island or Long Island (institutional population only).

Table 6.2-10
Cumulative Population Summary by Town or Neighborhood Area 2010 - 37.5M High Fleet

Town	Interval	1993 Actual Fleet	Alternative 1 Full Build With Peak Period Pricing	Alternative 1A Full Build Without Peak Period Pricing	Alternatives 2 and 3 Without Runway 14/32 and No Build	Alternative 4 No Action
Chelsea	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	6,140	2,064	1,415	0	0
East Boston - Eagle Hill	75 dB & more	0	0	0	0	0
	70 dB & more	2,079	120	0	0	0
	65 dB & more	8,265	2,593	2,593	237	237
East Boston - Orient Heights/Bayswater	75 dB & more	58	58	58	58	58
	70 dB & more	402	157	157	285	355
	65 dB & more	2,439	745	596	1,170	1,170
Other East Boston	75 dB & more	0	0	0	0	0
	70 dB & more	341	0	0	0	0
	65 dB & more	3,940	931	1,058	1,045	1,599
Total East Boston(1)	75 dB & more	58	58	58	58	58
	70 dB & more	2,822	277	157	285	355
	65 dB & more	14,644	4,269	4,247	2,452	3,006
Revere	75 dB & more	0	0	0	0	0
	70 dB & more	1,335	172	172	1,823	2,260
	65 dB & more	4,679	3,357	3,293	3,799	3,799
South Boston – City Point Area	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	0	0	0	854	37
South Boston - D Street Area	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	1,043	18	48	18	18
Total South Boston	75 dB & more	0	0	0	0	0
	70 dB & more	0	0	0	0	0
	65 dB & more	1,043	18	48	872	55
Winthrop - Point Shirley	75 dB & more	353	0	0	199	199
	70 dB & more	1,305	482	417	825	825
	65 dB & more	2,195	1,452	1,395	1,649	1,863
Winthrop - Court Road	75 dB & more	157	0	0	0	0
	70 dB & more	815	282	282	388	388
	65 dB & more	3,387	1,356	1,234	1,661	1,661
Rest of Winthrop	75 dB & more	0	0	0	0	0
	70 dB & more	103	0	0	0	0
	65 dB & more	2,298	835	375	1,115	1,115
Total Winthrop	75 dB & more	510	0	0	199	199
	70 dB & more	2,223	764	699	1,213	1,213
	65 dB & more	7,880	3,643	3,004	4,425	4,639
Totals - Population Summary	75 dB & more	568	58	58	257	257
	70 dB & more	6,380	1,213	1,028	3,321	3,828
	65 dB & more	34,386	13,351	12,007	11,548	11,499

(1) The population within the 65dB contour for the Jeffries Point neighborhood is 0 for all alternatives.

(2) Total counts do not include Deer Island or Long Island (institutional population only).

Table 6.2-11
Calculated Day-Night Sound Level Values in dB from Flight Operations for the 1999 – 29 Million Passenger Low Fleet

		1993	Alternative 1	Alternative 1A	Alternatives 2 and 3	Alternative 4
Noise Monitor	Location	Actual Fleet	Full Build With Peak Period Pricing	Full Build Without Peak Period Pricing	Without Runway 14/32 and No Build	No Action
1	Andrews Street, South End	57.9	56.9	56.9	56.1	56.0
2	B & Bolton, South Boston	66.2	64.5	64.5	63.6	63.4
3	South Boston Yacht Club, South Boston	64.1	61.4	61.3	62.8	62.8
4	Bayview & Grandview, Winthrop	78.1	75.2	75.2	75.9	76.1
5	Harborview & Faun Bar, Winthrop	71.5	68.1	68.1	69.5	69.8
6	Somerset & Johnson, Winthrop	68.0	65.5	65.5	65.1	65.3
7	Loring Road Near Court Road, Winthrop	78.0	75.1	75.1	73.4	73.6
8	Morton & Amelia, Winthrop	68.5	64.6	64.7	64.4	64.8
9	Bayswater & Nancia, East Boston	73.8	70.2	70.4	70.3	70.6
10	Bayswater & Shawsheen, East Boston	68.2	65.1	65.1	64.4	64.7
11	Don Orione, East Boston	63.3	60.3	60.4	60.1	60.3
12	East Boston Yacht Club, East Boston	72.7	70.0	70.0	70.0	70.1
13	East Boston High School, East Boston	68.5	66.0	66.0	66.2	66.2
A	Sumner near Lamson, East Boston	63.0	61.2	61.2	61.1	61.2
14	Jeffries Point Yacht Club, East Boston	64.5	62.4	62.5	62.5	62.6
15	Shurtleff & Essex, Chelsea	66.6	63.7	63.7	63.7	63.7
16	Bradstreet Avenue & Sales, Revere	70.6	68.6	68.7	68.8	69.1
17	Carey Circle, Revere	60.4	58.6	58.7	58.8	59.0
23	Myrtlebank/Hiltop, Dorchester	53.3	52.0	52.0	53.2	53.4
24	Cunningham Park, Milton	52.4	51.0	51.0	52.1	52.3
25	Squaw Rock Park, Quincy	50.8	48.6	48.7	49.0	49.1
26	Hull High School, Hull	55.6	54.9	55.0	54.7	54.8
E	Farragut @ 2nd, South Boston	64.4	61.3	61.3	62.5	62.5
Average change from 70 dB and above in 1993 (6 sites)		**0.0**	**-2.9**	**-2.9**	**-2.8**	**-2.6**
Average change from 65 dB and above in 1993 (12 sites)		**0.0**	**-2.9**	**-2.8**	**-2.9**	**-2.7**
Average change from all values in 1993 (23 sites)		**0.0**	**-2.4**	**-2.4**	**-2.3**	**-2.1**

Table 6.2-12
Calculated Day-Night Sound Level Values in dB from Flight Operations for the 2010 - 37.5 Million Passenger Low Fleet

		1993	Alternative 1	Alternative 1A	Alternatives 2 and 3	Alternative 4
Noise Monitor	Location	Actual Fleet	Full Build With Peak Period Pricing	Full Build Without Peak Period Pricing	Without Runway 14/32 and No Build	No Action
1	Andrews Street, South End	57.9	55.2	55.2	52.7	52.5
2	B & Bolton, South Boston	66.2	61.9	61.9	59.1	58.9
3	South Boston Yacht Club, South Boston	64.1	63.0	62.9	64.1	64.4
4	Bayview & Grandview, Winthrop	78.1	74.0	74.0	75.0	75.3
5	Harborview & Faun Bar, Winthrop	71.5	67.0	67.1	68.1	68.3
6	Somerset & Johnson, Winthrop	68.0	64.3	64.3	64.2	64.3
7	Loring Road Near Court Road, Winthrop	78.0	73.4	73.5	73.5	73.8
8	Morton & Amelia, Winthrop	68.5	63.1	63.2	64.1	64.3
9	Bayswater & Nancia, East Boston	73.8	69.5	69.6	70.7	70.9
10	Bayswater & Shawsheen, East Boston	68.2	63.6	63.7	63.9	64.1
11	Don Orione, East Boston	63.3	59.0	59.1	59.6	59.7
12	East Boston Yacht Club, East Boston	72.7	68.3	68.4	70.0	70.2
13	East Boston High School, East Boston	68.5	63.5	63.5	63.0	62.9
A	Sumner near Lamson, East Boston	63.0	59.6	59.6	59.5	59.6
14	Jeffries Point Yacht Club, East Boston	64.5	61.1	61.2	61.2	61.3
15	Shurtleff & Essex, Chelsea	66.6	61.6	61.6	60.8	60.6
16	Bradstreet Avenue & Sales, Revere	70.6	69.1	69.2	70.3	70.6
17	Carey Circle, Revere	60.4	59.2	59.3	60.4	60.7
23	Myrtlebank/Hiltop, Dorchester	53.3	53.9	54.0	55.0	55.2
24	Cunningham Park, Milton	52.4	52.9	53.1	53.9	54.2
25	Squaw Rock Park, Quincy	50.8	49.0	49.1	49.9	50.1
26	Hull High School, Hull	55.6	54.6	54.6	54.4	54.4
E	Farragut @ 2nd, South Boston	64.4	62.0	61.9	63.1	63.4
Average change from 70 dB and above in 1993 (6 sites)		0.0	-3.9	-3.8	-2.8	-2.6
Average change from 65 dB and above in 1993 (12 sites)		0.0	-4.1	-4.1	-3.8	-3.7
Average change from all values in 1993 (23 sites)		0.0	-3.1	-3.1	-2.8	-2.6

Table 6.2-13
Calculated Day-Night Sound Level Values in dB from Flight Operations for the 2010 - 37.5 Million Passenger High Fleet

Noise Monitor	Location	1993 Actual Fleet	Alternative 1 Full Build With Peak Period Pricing	Alternative 1A Full Build Without Peak Period Pricing	Alternatives 2 and 3 Without Runway 14/32 and No Build	Alternative 4 No Action
1	Andrews Street, South End	57.9	56.2	56.9	52.0	52.3
2	B & Bolton, South Boston	66.2	63.1	63.8	58.5	58.7
3	South Boston Yacht Club, South Boston	64.1	64.7	62.6	67.1	65.4
4	Bayview & Grandview, Winthrop	78.1	74.7	74.1	76.1	76.2
5	Harborview & Faun Bar, Winthrop	71.5	67.3	67.0	68.5	69.4
6	Somerset & Johnson, Winthrop	68.0	64.9	64.7	65.2	65.2
7	Loring Road Near Court Road, Winthrop	78.0	74.0	74.1	75.7	75.5
8	Morton & Amelia, Winthrop	68.5	65.2	64.0	66.4	66.0
9	Bayswater & Nancia, East Boston	73.8	71.1	70.5	72.4	72.7
10	Bayswater & Shawsheen, East Boston	68.2	65.0	64.3	66.1	65.9
11	Don Orione, East Boston	63.3	60.1	59.5	61.2	61.2
12	East Boston Yacht Club, East Boston	72.7	68.9	68.8	70.3	70.4
13	East Boston High School, East Boston	68.5	64.5	64.4	59.5	60.9
A	Sumner near Lamson, East Boston	63.0	59.6	60.1	59.1	60.0
14	Jeffries Point Yacht Club, East Boston	64.5	61.3	61.6	61.0	61.7
15	Shurtleff & Essex, Chelsea	66.6	62.7	62.5	57.6	58.8
16	Bradstreet Avenue & Sales, Revere	70.6	69.9	70.1	71.2	72.3
17	Carey Circle, Revere	60.4	60.2	60.3	61.5	62.5
23	Myrtlebank/Hiltop, Dorchester	53.3	54.2	54.0	56.1	56.3
24	Cunningham Park, Milton	52.4	52.7	53.1	54.4	55.3
25	Squaw Rock Park, Quincy	50.8	49.1	49.4	50.4	51.0
26	Hull High School, Hull	55.6	55.5	55.6	54.3	54.4
E	Farragut @ 2nd, South Boston	64.4	64.4	61.7	66.7	64.5
Average change from 70 dB and above in 1993 (6 sites)		0.0	-3.9	-3.8	-2.8	-2.6
Average change from 65 dB and above in 1993 (12 sites)		0.0	-4.1	-4.1	-3.8	-3.7
Average change from all values in 1993 (23 sites)		0.0	-3.1	-3.1	-2.8	-2.6

Table 6.2-14
Average Change in In-flight Noise at Locations Where 1993 Day-Night Sound Levels Equaled or Exceeded 70 dB (6 Sites)

	All Actions (Alternative 1)	All Actions except Peak Period Pricing (Alternative 1A)	All Actions except Runway 14/32 and No Build (Alternatives 2 and 3)	No Action (Alternative 4)	Difference (Alternative 4 and Alternative1)	Difference (Alternative 4 and Alternative 1A)
1999 - 29M Low	-2.9	-2.9	-2.8	-2.6	-0.3	-0.3
2010 - 37.5M Low	-3.9	-3.8	-2.8	-2.6	-1.3	-1.2
2010 - 37.5M High	-3.1	-3.3	-1.7	-1.4	-1.7	-1.9

Table 6.2-15
Average Change in In-flight Noise at Locations Where 1993 Day-Night Sound Levels Equaled or Exceeded 65 dB (12 Sites)

	All Actions (Alternative 1)	All Actions except Peak Period Pricing (Alternative 1A)	All Actions except Runway 14/32 and No Build (Alternatives 2 and 3)	No Action (Alternative 4)	Difference (Alternative 4 and Alternative1)	Difference (Alternative 4 and Alternative 1A)
1999 - 29M Low	-2.9	-2.9	-2.9	-2.7	-0.2	-0.2
2010 - 37.5M Low	-4.1	-4.1	-3.8	-3.7	-0.4	-0.4
2010 - 37.5M High	-3.0	-3.5	-3.1	-3.0	0	-.05

Table 6.2-16
Comparisons of the Calculated Nighttime Equivalent Sound Level Values In dB from Flight Operations for the 1999 - 29m Low Fleet

Noise Monitor	Location	1993 Actual Fleet	Alternative 1 Full Build With Peak Period Pricing	Alternative 1A Full Build Without Peak Period Pricing	Alternatives 2 and 3 Without Runway 14/32 and No Build	Alternative 4 No Action
1	Andrews Street, South End	49.6	45.9	46.0	49.0	48.8
2	B & Bolton, South Boston	57.9	53.1	53.2	56.5	56.3
3	South Boston Yacht Club, South Boston	53.9	54.1	54.1	53.9	54.0
4	Bayview & Grandview, Winthrop	68.4	67.7	67.7	66.8	67.3
5	Harborview & Faun Bar, Winthrop	62.2	61.0	61.1	61.3	61.8
6	Somerset & Johnson, Winthrop	58.8	57.6	57.7	57.4	57.6
7	Loring Road Near Court Road, Winthrop	68.1	68.3	68.3	64.7	65.1
8	Morton & Amelia, Winthrop	56.7	56.3	56.7	55.1	55.8
9	Bayswater & Nancia, East Boston	62.3	62.4	62.6	61.4	62.0
10	Bayswater & Shawsheen, East Boston	57.5	57.3	57.5	55.4	55.9
11	Don Orione, East Boston	53.1	52.6	52.8	51.3	51.8
12	East Boston Yacht Club, East Boston	63.7	63.0	63.0	62.1	62.3
13	East Boston High School, East Boston	61.8	57.9	57.8	60.1	60.1
A	Sumner near Lamson, East Boston	55.2	53.9	54.0	54.2	54.4
14	Jeffries Point Yacht Club, East Boston	56.2	54.8	54.8	55.3	55.5
15	Shurtleff & Essex, Chelsea	59.9	55.3	55.3	57.5	57.5
16	Bradstreet Avenue & Sales, Revere	60.3	61.7	61.8	61.2	61.6
17	Carey Circle, Revere	50.2	51.5	51.6	51.0	51.3
23	Myrtlebank/Hiltop, Dorchester	43.4	44.9	45.0	44.7	44.9
24	Cunningham Park, Milton	43.1	43.9	44.1	43.7	44.0
25	Squaw Rock Park, Quincy	41.4	41.3	41.4	40.8	41.1
26	Hull High School, Hull	47.7	47.2	47.3	47.8	47.9
E	Farragut @ 2nd, South Boston	54.2	53.7	53.7	53.7	53.7

Table 6.2-17
Calculated Night Equivalent Sound Level Values in dB from Flight Operations for the 2010 - 37.5m Low Fleet

		1993	Alternative 1	Alternative 1A	Alternatives 2 and 3	Alternative 4
Noise Monitor	Location	Actual Fleet	Full Build With Peak Period Pricing	Full Build Without Peak Period Pricing	Without Runway 14/32 and No Build	No Action
1	Andrews Street, South End	49.6	44.3	44.1	45.4	45.1
2	B & Bolton, South Boston	57.9	50.9	50.7	52.1	51.9
3	South Boston Yacht Club, South Boston	53.9	54.3	54.2	54.6	55.0
4	Bayview & Grandview, Winthrop	68.4	66.2	66.3	66.2	66.7
5	Harborview & Faun Bar, Winthrop	62.2	59.0	59.2	59.6	60.1
6	Somerset & Johnson, Winthrop	58.8	56.1	56.2	56.4	56.6
7	Loring Road Near Court Road, Winthrop	68.1	66.8	66.9	65.5	66.0
8	Morton & Amelia, Winthrop	56.7	55.4	55.5	55.9	56.4
9	Bayswater & Nancia, East Boston	62.3	62.3	62.4	62.9	63.4
10	Bayswater & Shawsheen, East Boston	57.5	55.8	56.0	55.3	55.7
11	Don Orione, East Boston	53.1	50.8	51.0	50.8	51.2
12	East Boston Yacht Club, East Boston	63.7	61.5	61.6	62.4	62.7
13	East Boston High School, East Boston	61.8	55.4	55.3	56.8	56.7
A	Sumner near Lamson, East Boston	55.2	51.9	51.9	52.3	52.4
14	Jeffries Point Yacht Club, East Boston	56.2	53.0	53.1	53.6	53.8
15	Shurtleff & Essex, Chelsea	59.9	53.3	53.2	54.5	54.4
16	Bradstreet Avenue & Sales, Revere	60.3	62.5	62.6	63.2	63.6
17	Carey Circle, Revere	50.2	52.6	52.7	53.2	53.7
23	Myrtlebank/Hiltop, Dorchester	43.4	45.8	46.0	46.3	46.8
24	Cunningham Park, Milton	43.1	44.9	45.2	45.5	45.9
25	Squaw Rock Park, Quincy	41.4	41.1	41.3	41.6	42.0
26	Hull High School, Hull	47.7	46.8	46.8	47.7	47.7
E	Farragut @ 2nd, South Boston	54.2	52.9	52.7	53.2	53.6

Table 6.2-18
Maximum Sound Level (Lmax) Values in dB from Flight Operations - Alternatives 1 and 1A

			Alternative 1			Alternative 1A		
		1993	1999	2010	2010	1999	2010	2010
Noise Monitor	Location	Actual Fleet	29M Low	37.5M Low	37.5M High	29M Low	37.5M Low	37.5M High
1	Andrews Street, South End	91.3	89.5	84.5	84.5	89.5	84.5	84.5
2	B & Bolton, South Boston	101.6	99.2	93.0	93.0	99.2	93.0	93.0
3	South Boston Yacht Club, South Boston	94.4	94.4	91.8	91.8	94.4	86.8	86.8
4	Bayview & Grandview, Winthrop	120.5	112.3	106.1	106.1	112.3	106.1	106.1
5	Harborview & Faun Bar, Winthrop	99.7	100.7	94.3	94.3	100.7	94.3	94.3
6	Somerset & Johnson, Winthrop	89.7	90.4	81.9	81.9	90.4	81.9	81.9
7	Loring Road near Court Road, Winthrop	104.7	104.7	97.1	97.1	104.7	97.1	97.1
8	Morton & Amelia, Winthrop	103.6	102.5	97.3	97.3	102.5	96.1	97.3
9	Bayswater & Nancia, E. Boston	110.0	107.7	103.9	103.9	107.7	103.9	103.9
10	Bayswater & Shawsheen, East Boston	96.5	96.5	90.1	90.1	96.5	90.1	90.1
11	Don Orione, East Boston	90.3	90.3	83.8	83.8	90.3	83.8	83.8
12	East Boston Yacht Club, East Boston	93.0	93.0	85.8	85.8	93.0	85.8	85.8
13	East Boston High School, East Boston	103.4	102.0	97.0	97.0	102.0	97.0	97.0
A	Sumner near Lamson, East Boston	81.8	82.2	81.2	81.2	82.2	81.2	74.5
14	Jeffries Point Yacht Club, East Boston	84.8	85.3	82.3	82.3	85.3	82.3	77.3
15	Shurtleff & Essex, Chelsea	102.7	101.1	96.4	96.4	101.1	96.4	96.4
16	Bradstreet Avenue & Sales, Revere	104.1	102.5	97.7	97.7	102.5	97.7	97.7
17	Carey Circle, Revere	92.3	89.6	87.1	87.1	89.6	87.1	87.1
23	Myrtlebank/Hiltop, Dorchester	81.1	79.7	79.7	79.7	79.7	79.1	79.7
24	Cunningham Park, Milton	77.3	75.8	75.8	75.8	75.8	75.8	75.8
25	Squaw Rock Park, Quincy	78.7	78.7	73.5	73.5	78.7	73.5	73.5
26	Hull High School, Hull	86.0	87.4	83.7	83.7	87.4	83.7	83.7
E	Farragut @ 2nd, South Boston	94.5	94.5	91.9	91.9	94.5	83.9	83.9

Table 6.2-19
Calculated Time-above Threshold Values for a 24-hour Period from Flight Operations for 1999 - 29M Low Fleet Scenario (minutes per day)

Identity		Alternative 1					Alternative 1A					Alternative 4				
Number	Location	95 dB	85 dB	75 dB	65 dB	55 dB	95 dB	85 dB	75 dB	65 dB	55 dB	95 dB	85 dB	75 dB	65 dB	55 dB
1	Andrews St, South End	0	0	3	23	79	0	0	3	23	80	0	0	1	8	42
2	B & Bolton, South Boston	0	1	12	41	110	0	1	12	41	110	0	1	4	16	68
3	South Boston Yacht Club, South Boston	0	0	4	35	161	0	0	3	34	158	0	0	9	70	235
4	Bayview & Grandview, Winthrop	1	10	28	74	211	1	10	28	74	212	2	17	51	119	273
5	Harborview & Faun Bar, Winthrop	0	1	13	54	170	0	1	13	54	171	0	3	26	91	237
6	Somerset & Johnson, Winthrop	0	0	12	102	409	0	0	12	102	408	0	0	10	95	376
7	Lonng Road near Court Road, Winthrop	0	8	39	145	446	0	8	39	146	449	1	11	51	200	557
8	Morton & Amelia, Winthrop	0	1	9	49	201	0	1	9	49	202	0	1	11	63	265
9	Bayswater & Nancia, East Boston	0	4	20	72	218	0	4	20	72	220	0	5	28	99	254
10	Bayswater & Shawsheen, East Boston	0	1	10	56	195	0	1	10	56	196	0	1	12	66	197
11	Don Orione, East Boston	0	0	3	32	142	0	0	3	31	142	0	0	4	39	155
12	East Boston Yacht Club, East Boston	0	2	24	148	407	0	2	25	149	412	0	3	33	191	500
13	East Boston High School, East Boston	0	1	10	39	137	0	1	10	40	141	0	0	3	19	95
A	Sumner near Lamson, East Boston	0	0	2	42	234	0	0	2	42	235	0	0	2	32	222
14	Jeffries Point Yacht Club, E.ast Boston	0	0	4	60	283	0	0	4	60	284	0	0	4	50	287
15	Shurtleff & Essex, Chelsea	0	1	7	28	89	0	1	7	28	92	0	0	3	13	60
16	Bradstreet Avenue & Sales, Revere	0	2	12	33	93	0	2	12	33	93	0	3	17	45	120
17	Carey Circle, Revere	0	0	3	17	45	0	0	3	17	45	0	0	3	24	64
23	Myrtlebank/Hiltop, Dorchester	0	0	0	4	38	0	0	0	4	36	0	0	0	9	76
24	Cunningham Park, Milton	0	0	0	5	30	0	0	0	5	28	0	0	0	10	59
25	Squaw Rock Park, Quincy	0	0	0	1	24	0	0	0	1	24	0	0	0	1	36
26	Hull High School, Hull	0	0	0	14	79	0	0	0	15	79	0	0	0	9	55
E	Farragut @ 2nd, South Boston	0	0	4	46	207	0	0	3	45	204	0	0	8	71	275

Table 6.2-20
Calculated Time-above Threshold Values for the Nighttime (10:00 PM to 7:00 AM) from Flight Operations for 1999 - 29M Low (minutes per day)

Identity		Alternative 1					Alternative 1A					Alternative 4				
Number	Location	95 dB	85 dB	75 dB	65 dB	55 dB	95 dB	85 dB	75 dB	65 dB	55 dB	95 dB	85 dB	75 dB	65 dB	55 dB
1	Andrews St, South End	0	0	0	1	4	0	0	0	1	4	0	0	0	2	6
2	B & Bolton, South Boston	0	0	0	2	6	0	0	0	2	6	0	0	1	3	9
3	South Boston Yacht Club, South Boston	0	0	1	7	23	0	0	1	7	24	0	0	1	7	25
4	Bayview & Grandview, Winthrop	0	2	4	12	34	0	2	4	12	34	0	1	4	12	35
5	Harborview & Faun Bar, Winthrop	0	0	2	9	27	0	0	2	9	27	0	0	3	9	27
6	Somerset & Johnson, Winthrop	0	0	2	15	46	0	0	2	15	46	0	0	2	16	50
7	Loring Road near Court Road, Winthrop	0	2	10	29	68	0	2	10	29	69	0	1	6	21	57
8	Morton & Amelia, Winthrop	0	0	1	9	31	0	0	1	9	31	0	0	1	8	30
9	Bayswater & Nancia, East Boston	0	1	3	11	29	0	1	3	11	30	0	1	3	10	30
10	Bayswater & Shawsheen, East Boston	0	0	2	11	36	0	0	2	11	36	0	0	1	9	31
11	Don Orione, East Boston	0	0	0	5	25	0	0	1	5	26	0	0	0	4	22
12	East Boston Yacht Club, East Boston	0	1	6	30	69	0	1	6	30	69	0	0	6	25	59
13	East Boston High School, East Boston	0	0	1	5	17	0	0	1	5	17	0	0	2	6	19
A	Sumner near Lamson, East Boston	0	0	1	8	35	0	0	1	8	35	0	0	1	9	37
14	Jeffries Point Yacht Club, E.ast Boston	0	0	1	10	37	0	0	1	10	38	0	0	1	11	41
15	Shurtleff & Essex, Chelsea	0	0	1	3	11	0	0	1	3	11	0	0	1	4	13
16	Bradstreet Avenue & Sales, Revere	0	1	2	5	15	0	1	2	5	15	0	1	2	5	14
17	Carey Circle, Revere	0	0	1	3	7	0	0	1	3	7	0	0	1	3	7
23	Myrtlebank/Hiltop, Dorchester	0	0	0	1	6	0	0	0	1	7	0	0	0	1	7
24	Cunningham Park, Milton	0	0	0	1	6	0	0	0	1	6	0	0	0	1	6
25	Squaw Rock Park, Quincy	0	0	0	0	5	0	0	0	0	5	0	0	0	0	5
26	Hull High School, Hull	0	0	0	2	12	0	0	0	2	12	0	0	0	2	12
E	Farragut @ 2nd, South Boston	0	0	0	7	26	0	0	0	7	27	0	0	0	7	28

Table 6.2-21
Change in Day-Night Sound Levels from Ground Operations by Noise Monitoring Site
DNL Change: Full Build (Alternatives 1 and 1A) Over No Action (Alternative 4)

Fleet	Loring/ Court Road Winthrop (NMS #7)	Bayswater and Shawsheen, East Boston (NMS #10)	East Boston Yacht Club, East Boston (NMS #12)	Somerset and Johnson, Winthrop (NMS #6)	Sumner/ Lamson, East Boston (NMS #A)	Jeffries Point Yacht Club, East Boston (NMS #14)	Farragut @ 2nd S. Boston (NMS #E)
Average Propagation Conditions							
1999 29M Low	-0.2	-0.8	-1.0	-0.8	0.4	0.6	1.4
2010 37.5M Low	-4.6	-5.0	-3.2	-0.6	-0.6	-0.7	0.7
2010 37.5M High	-4.7	-1.5	-1.4	-1.5	-0.3	-0.3	0.2
Average Change dB	-3.2	-2.4	-1.9	-1.0	-0.2	-0.1	0.8
Maximum Propagation Conditions							
1999 29M Low	-0.6	-1	-1.2	-0.8	0.2	0.6	-1.1
2010 37.5M Low	-4.7	-5	-3.4	-0.3	-0.8	-1.0	-1.6
2010 37.5M High	-4.6	-1.3	-1.2	-1.3	-0.3	-0.3	-2.1
Average Change dB	-3.3	-2.4	-1.9	-0.8	-0.3	-0.2	-1.6

Table 6.2-22
Comparison of Day-Night Sound Levels from Ground Operations for Location NMS #6: Somerset and Johnson, Winthrop

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	DNL	Change	DNL	Change	DNL	Change	DNL
Average Propagation Conditions							
1993							38.6
1999 - 29M Low	37.4	-0.8	37.3	-0.9	38.2	0.0	38.2
2010 - 37.5M Low	37.9	-0.6	37.3	-1.2	38.3	-0.2	38.5
2010 - 37.5M High	38.2	-1.5	37.5	-2.2	38.6	-1.1	39.7
Average Change dB		-1.0		-1.4		-0.4	
Maximum Propagation Conditions							
1993							53.6
1999 - 29M Low	53.0	-0.8	53.0	-0.8	53.8	0.0	53.8
2010 - 37.5M Low	53.3	-0.3	52.6	-1.0	53.5	-0.1	53.6
2010 - 37.5M High	53.6	-1.3	52.8	-2.1	53.9	-1.0	54.9
Average Change dB		-0.8		-1.3		-0.5	

Change = Change over No Action (Alternative 4)

Table 6.2-23
Comparison of Day-Night Sound Levels from Ground Operations for Location NMS #7: Loring Road Near Court Road, Winthrop

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	DNL	Change	DNL	Change	DNL	Change	DNL
Average Propagation Conditions							
1993							51.6
1999 - 29M Low	45.1	-0.2	45.5	0.2	45.3	0.0	45.3
2010 - 37.5M Low	47.2	-4.6	51.3	-0.5	51.4	-0.4	51.8
2010 - 37.5M High	45.3	-4.7	48.1	-1.9	49.3	-0.7	50.0
Average Change dB		-3.2		-0.7		-.06	
Maximum Propagation Conditions							
1993							66.7
1999 - 29M Low	60.3	-0.6	60.9	0.0	60.9	0.0	60.9
2010 - 37.5M Low	62.2	-4.7	66.4	-0.5	66.5	-0.4	66.9
2010 - 37.5M High	60.5	-4.6	63.3	-1.8	64.4	-0.7	65.1
Average Change dB		-3.3		-1.2		-0.6	

Change = Change over No Action (Alternative 4)

Table 6.2-24
Comparison of Day-Night Sound Levels from Ground Operations for Location NMS #10: Bayswater and Shawsheen, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	DNL	Change	DNL	Change	DNL	Change	DNL
Average Propagation Conditions							
1993							45.8
1999 - 29M Low	42.1	-0.8	43.4	0.5	42.9	0.0	42.9
2010 - 37.5M Low	42.5	-5.0	46.5	-1.0	47.1	-0.4	47.5
2010 - 37.5M High	43.6	-1.5	45.9	0.8	44.5	-0.6	45.1
Average Change dB		-2.4		0.1		-0.3	
Maximum Propagation Conditions							
1993							60.9
1999 - 29M Low	57.3	-1.0	58.6	0.3	58.3	0.0	58.3
2010 - 37.5M Low	57.4	-5.0	61.3	-1.1	62.1	-0.3	62.4
2010 - 37.5M High	58.5	-1.3	60.9	1.1	59.5	-0.3	59.8
Average Change dB		-2.4		0.1		-0.2	

Change = Change over No Action (Alternative 4)

Table 6.2-25
Comparison of Day-Night Sound Levels from Ground Operations for Location NMS #12: East Boston Yacht Club, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	**DNL**	**Change**	**DNL**	**Change**	**DNL**	**Change**	**DNL**
Average Propagation Conditions							
1993							49.4
1999 - 29M Low	47.3	-1.0	48.2	-0.1	48.3	0.0	48.3
2010 - 37.5M Low	47.0	-3.2	49.5	-0.7	49.9	-0.3	50.2
2010 - 37.5M High	48.4	-1.4	50.1	0.3	49.3	-0.5	49.8
Average Change dB		-1.9		-0.2		-0.3	
Maximum Propagation Conditions							
1993							64.3
1999 - 29M Low	62.6	-1.2	63.4	-0.4	63.8	0.0	63.8
2010 - 37.5M Low	61.8	-3.4	64.3	-0.9	64.9	-0.3	65.2
2010 - 37.5M High	63.4	-1.2	65.0	0.4	64.2	-0.4	64.6
Average Change dB		-1.9		-0.3		-0.2	

Change = Change over No Action (Alternative 4)

Table 6.2-26
Comparison of Day-Night Sound Levels from Ground Operations for Location NMS #14: Jeffries Point Yacht Club, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	**DNL**	**Change**	**DNL**	**Change**	**DNL**	**Change**	**DNL**
Average Propagation Conditions							
1993							39.6
1999 - 29M Low	40.8	0.6	40.7	0.5	40.1	-0.1	40.2
2010 - 37.5M Low	38.2	-0.7	39.2	0.3	38.8	-0.1	38.9
2010 - 37.5M High	39.7	-0.3	40.0	0.0	39.5	-0.5	40.0
Average Change dB		-0.1		0.3		-0.2	
Maximum Propagation Conditions							
1993							55.7
1999 - 29M Low	56.5	0.6	56.5	0.6	55.9	0.0	55.9
2010 - 37.5M Low	53.2	-1.0	54.5	0.3	54.1	-0.1	54.2
2010 - 37.5M High	55.1	-0.3	55.7	0.3	55.2	-0.2	55.4
Average Change dB		-0.2		0.4		-0.1	

Change = Change over No Action (Alternative 4)

Table 6.2-27
Comparison of Day-Night Sound Levels from Ground Operations for Location A: Sumner near Lamson, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	DNL	Change	DNL	Change	DNL	Change	DNL
Average Propagation Conditions							
1993							41.8
1999 - 29M Low	40.2	0.4	40.2	0.4	39.8	0.0	39.8
2010 - 37.5M Low	40.9	-0.6	41.4	-0.1	41.3	-0.2	41.5
2010 - 37.5M High	41.5	-0.3	41.4	-0.4	41.3	-0.5	41.8
Average Change dB		-0.2		-0.0		-0.2	
Maximum Propagation Conditions							
1993							57.6
1999 - 29M Low	55.2	0.2	55.4	0.4	55.0	0.0	55.0
2010 - 37.5M Low	55.7	-0.8	56.4	-0.1	56.4	-0.1	56.5
2010 - 37.5M High	56.6	-0.3	56.6	-0.3	56.5	-0.4	56.9
Average Change dB		-0.3		0.0		-0.2	

Change = Change over No Action (Alternative 4)

Table 6.2-28
Comparison of Day-Night Sound Levels from Ground Operations for Location E: Farragut @ 2nd, South Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	DNL	Change	DNL	Change	DNL	Change	DNL
Average Propagation Conditions							
1993							22.9
1999 - 29M Low	22.9	1.4	24.1	2.6	21.3	-0.2	21.5
2010 - 37.5M Low	24.2	0.7	25.1	1.6	23.2	-0.3	23.5
2010 - 37.5M High	24.3	0.2	24.9	0.8	22.9	-1.2	24.1
Average Change dB		0.8		1.7		-0.6	
Maximum Propagation Conditions							
1993							39.4
1999 - 29M Low	37.1	-1.1	39.9	1.7	38.1	-0.1	38.2
2010 - 37.5M Low	38.6	-1.6	40.7	0.5	40.0	-0.2	40.2
2010 - 37.5M High	38.8	-2.1	40.6	-0.3	39.7	-1.2	40.9
Average Change dB		-1.6		0.6		-0.5	

Change = Change over No Action (Alternative 4)

Table 6.2-29
Comparison of Nighttime Equivalent Sound Levels (10:00 PM to 7:00 AM) from Ground Operations For Location NMS #12: East Boston Yacht Club, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	Leq	Change	Leq	Change	Leq	Change	Leq
Average Propagation Conditions							
1993							39.7
1999 - 29M Low	38.7	0.6	38.2	0.1	37.9	-0.2	38.1
2010 - 37.5M Low	39.6	-1.8	40.8	-0.6	40.9	-0.5	41.4
2010 - 37.5M High	41.2	-0.5	42.3	0.6	41.2	-0.5	41.7
Average Change dB		-0.6		0.0		-0.4	
Maximum Propagation Conditions							
1993							54.4
1999 - 29M Low	53.9	0.5	53.4	0.0	53.2	-0.2	53.4
2010 - 37.5M Low	54.2	-2.0	55.5	-0.7	55.7	-0.5	56.2
2010 - 37.5M High	56.2	-0.1	57.2	0.9	56.1	-0.2	56.3
Average Change dB		-0.5		0.1		-0.3	

Change = Change over No Action (Alternative 4)

Table 6.2-30
Comparison of Maximum A-weighted Sound Levels from Ground Operations for Location NMS #12: East Boston Yacht Club, East Boston

	Full Build (Alternative 1/1A)		All Actions Except Runway 14/32 (Alternative 2)		No Build (Alternative 3)		No Action (Alternative 4)
Fleet	L_{max}	Change	L_{max}	Change	L_{max}	Change	L_{max}
Average Propagation Conditions							
1993							59.0
1999 - 29M Low	59.0	0.0	61.0	2.0	59.0	0.0	59.0
2010 - 37.5M Low	61.0	2.0	61.0	2.0	59.0	0.0	59.0
2010 - 37.5M High	59.0	0.0	59.0	0.0	59.0	0.0	59.0
Average Change dB		0.7		1.3		0.0	
Maximum Propagation Conditions							
1993							75.0
1999 - 29M Low	75.0	0.0	77.0	2.0	75.0	0.0	75.0
2010 - 37.5M Low	77.0	2.0	77.0	2.0	75.0	0.0	75.0
2010 - 37.5M High	75.0	0.0	75.0	0.0	75.0	0.0	75.0
Average Change dB		0.7		1.3		0.0	

Change = Change over No Action (Alternative 4)

Table 6.2-31
Comparison of Time-Above Nighttime Threshold Values in Minutes Per Day from Ground Operations at NMS #12: East Boston Yacht Club, East Boston

	Full Build (Alternative 1/1A)			All Actions Except Runway 14/32 (Alternative 2)			No Build (Alternative 3)			No Action (Alternative 4)		
Fleet	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB
Average Propagation Conditions												
1993	--	--	--	--	--	--	--	--	--	0.0	0.0	1.0
1999 - 29M Low	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0
1999 - 29M High	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0
2010 - 37.5M Low	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0
2010 - 37.5M High	0.0	0.0	3.0	0.0	0.0	4.0	0.0	0.0	1.0	0.0	0.0	1.0
2010 - 45M High	0.0	0.0	2.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0
Maximum Propagation Conditions												
1993	--	--	--	--	--	--	--	--	--	0.0	7.0	64.0
1999 - 29M Low	0.0	5.0	69.0	0.0	3.0	73.0	0.0	4.0	64.0	0.0	4.0	67.0
1999 - 29M High	0.0	9.0	81.0	0.0	6.0	70.0	0.0	5.0	84.0	0.0	6.0	91.0
2010 - 37.5M Low	0.0	6.0	63.0	0.0	9.0	84.0	0.0	10.0	85.0	0.0	11.0	96.0
2010 - 37.5M High	0.0	10.0	111.0	0.0	13.0	127.0	0.0	10.0	121.0	0.0	11.0	127.0
2010 - 45M High	0.0	6.0	63.0	0.0	15.0	164.0	0.0	15.0	155.0	0.0	18.0	205.0

Table 6.2-32
Comparison of Time-Above 24-hour Threshold Values in Minutes Per Day from Ground Operations at NMS #12: East Boston Yacht Club, East Boston

	Full Build (Alternative 1/1A)			All Actions Except Runway 14/32 (Alternative 2)			No Build (Alternative 3)			No Action (Alternative 4)		
Fleet	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB	75 dB	65 dB	55 dB
Average Propagation Conditions												
1993	--	--	--	--	--	--	--	--	--	0.0	0.0	30.
1999 - 29M Low	0.0	0.0	14.0	0.0	0.0	22.0	0.0	0.0	21.0	0.0	0.0	21.
1999 - 29M High	0.0	0.0	12.0	0.0	0.0	20.0	0.0	0.0	17.0	0.0	0.0	17.
2010 - 37.5M Low	0.0	0.0	7.0	0.0	0.0	24.0	0.0	0.0	27.0	0.0	0.0	27.
2010 - 37.5M High	0.0	0.0	10.0	0.0	0.0	23.0	0.0	0.0	9.0	0.0	0.0	8.
2010 - 45M High	0.0	0.0	7.0	0.0	0.0	22.0	0.0	0.0	18.0	0.0	0.0	16.
Maximum Propagation Conditions												
1993	--	--	--	--	--	--	--	--	--	0.0	140.0	981.
1999 - 29M Low	0.0	67.0	727.0	0.0	118.0	1014.0	0.0	148.0	1114.0	0.0	146.0	1112.
1999 - 29M High	0.0	45.0	675.0	0.0	78.0	879.0	0.0	84.0	953.0	0.0	85.0	1008.
2010 - 37.5M Low	0.0	35.0	429.0	0.0	110.0	915.0	0.0	136.0	1123.0	0.0	138.0	1144.
2010 - 37.5M High	0.0	47.0	569.0	0.0	102.0	886.0	0.0	95.0	982.0	0.0	108.0	1168.
2010 - 45M High	0.0	38.0	675.0	0.0	87.0	934.0	0.0	111.0	1105.0	0.0	127.0	1136.

FIGURE 6.2-5: DWELL EXCEEDANCE BY NOISE AREA

1999 29M Low (510,000 Ops)

Annual Hours of Dwell Exceedance

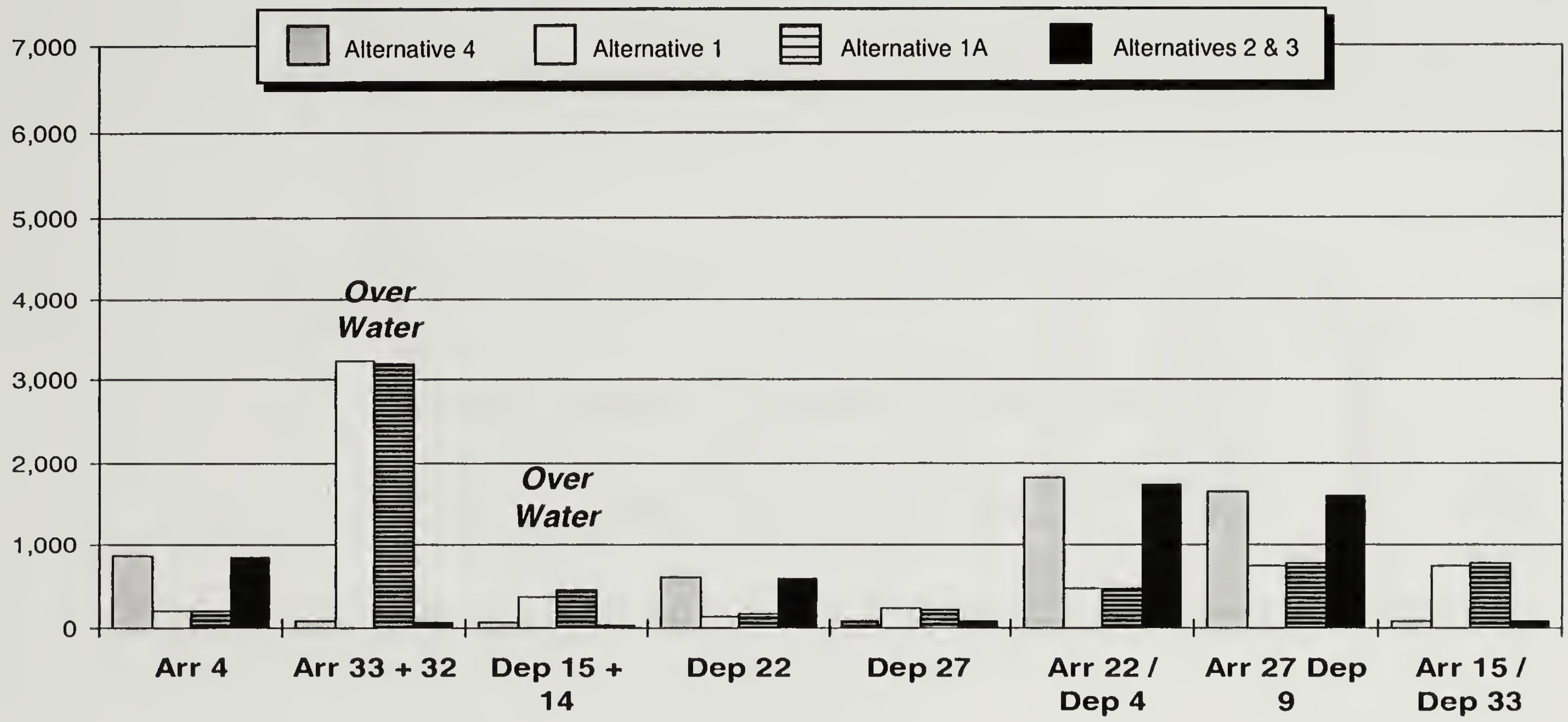


FIGURE 6.2-6: DWELL EXCEEDANCE BY NOISE AREA

2010 37.5M Low (543,000 Ops)

Annual Hours of Dwell Exceedance

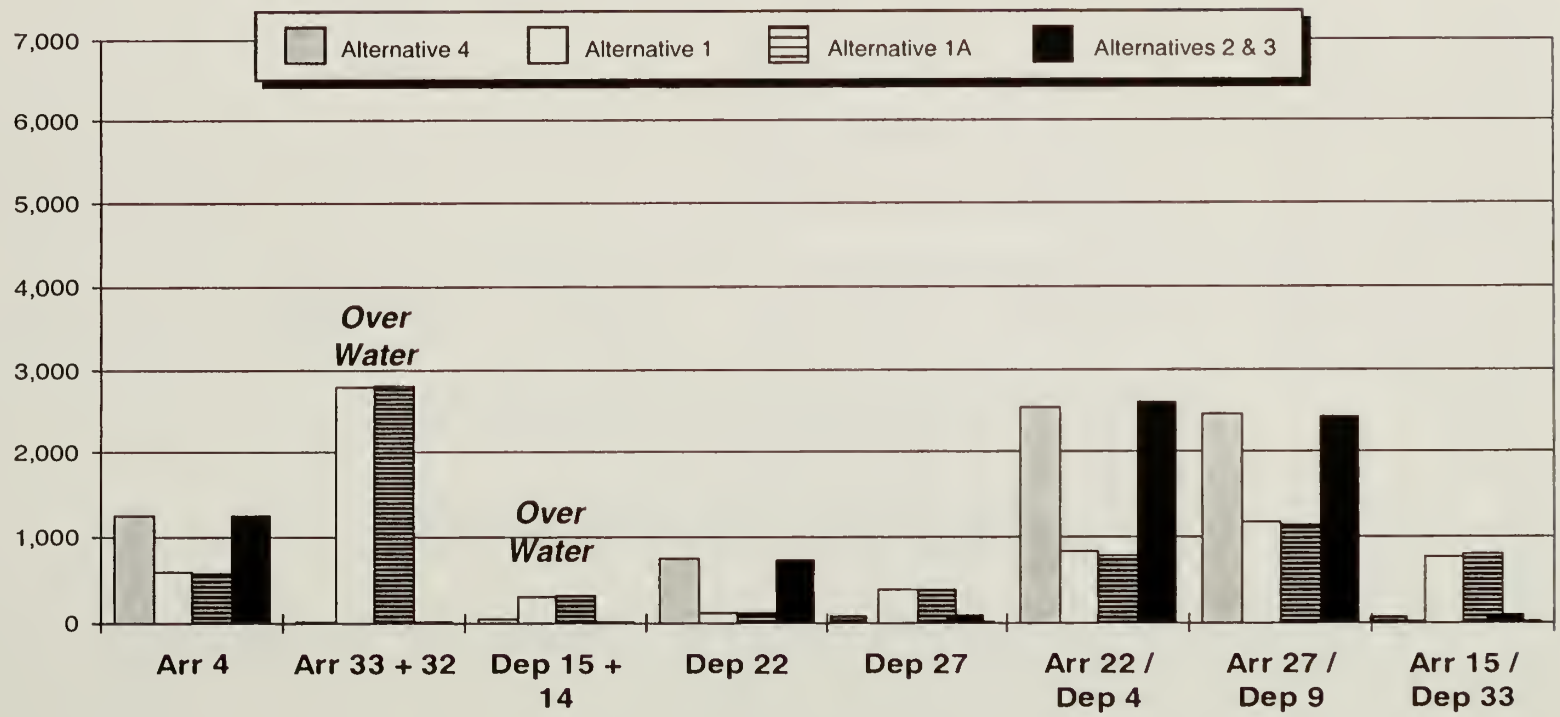


FIGURE 6.2-7: PERSISTENCE EXCEEDANCE BY NOISE AREA

1999 29M Low (510,000 Ops)

Annual Hours of Persistence Exceedance

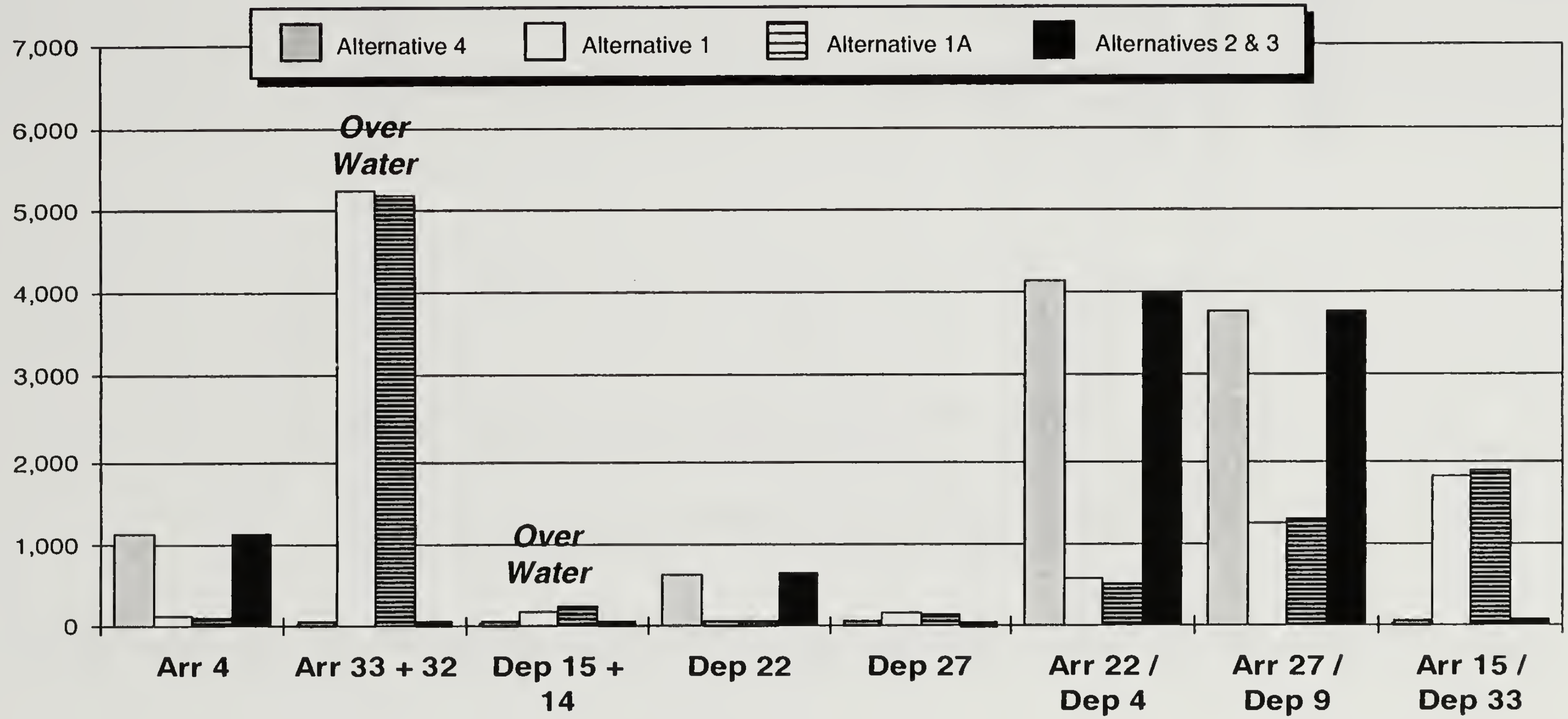
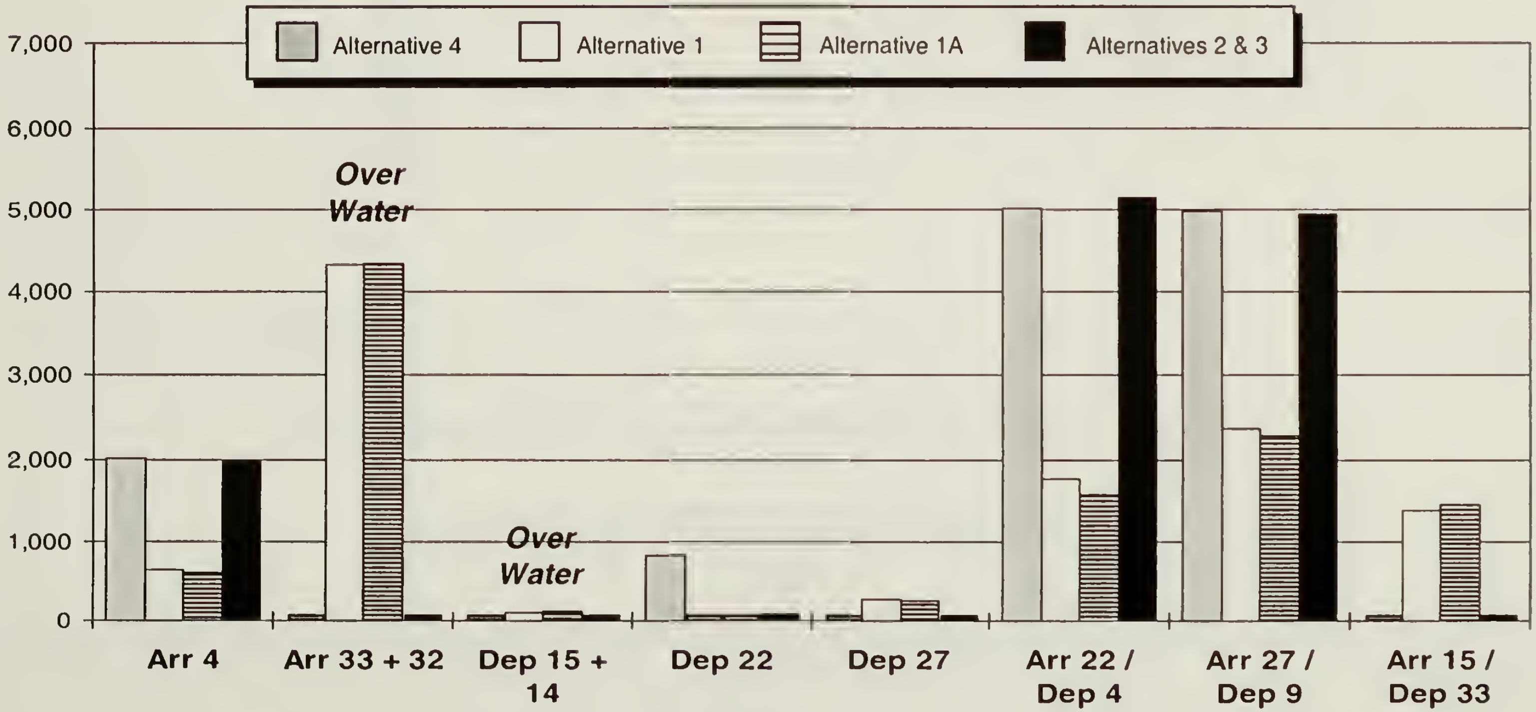


FIGURE 6.2-8: PERSISTENCE EXCEEDANCE BY NOISE AREA

2010 37.5M Low (543,000 Ops)

Annual Hours of Persistence Exceedance



II. CUMMULATIVE POPULATION SUMMARIES

Table 1.1

Cumulative Population Summary by Town or Neighborhood
1999 29 Million Passenger Low Fleet

Town	Sound Level	1993	No Action (Alt. 4)	All Actions (Alt. 1)	All Actions ex. PHP (Alt. 1A)	No Runway/ No Build (Alt. 2/3)
BOSTON (OTHER*)	Greater than or equal to 75 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 70 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 65 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 60 dB	3,270	0	0	0	0
CHELSEA	Greater than or equal to 75 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 70 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 65 dB	6,140	3,056	3,171	3,300	2,900
CHELSEA	Greater than or equal to 60 dB	13,357	10,232	10,282	10,370	10,232
EAST BOSTON	Greater than or equal to 75 dB	58	58	0	0	58
EAST BOSTON	Greater than or equal to 70 dB	2,822	437	338	398	398
EAST BOSTON	Greater than or equal to 65 dB	14,644	7,117	7,256	7,256	6,915
EAST BOSTON	Greater than or equal to 60 dB	28,780	24,193	24,318	24,318	23,623
E BOSTON (Jeff Pt.)	Greater than or equal to 75 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 70 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 65 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 60 dB	2,288	1,842	1,842	1,842	1,842
EVERETT	Greater than or equal to 75 dB	0	0	0	0	0
EVERETT	Greater than or equal to 70 dB	0	0	0	0	0
EVERETT	Greater than or equal to 65 dB	0	0	0	0	0
EVERETT	Greater than or equal to 60 dB	766	220	340	340	0
QUINCY	Greater than or equal to 75 dB	0	0	0	0	0
QUINCY	Greater than or equal to 70 dB	0	0	0	0	0
QUINCY	Greater than or equal to 65 dB	0	0	0	0	0
QUINCY	Greater than or equal to 60 dB	0	0	0	0	0
REVERE	Greater than or equal to 75 dB	0	0	0	0	0
REVERE	Greater than or equal to 70 dB	1,335	0	0	0	0
REVERE	Greater than or equal to 65 dB	4,679	3,001	2,896	2,999	2,999
REVERE	Greater than or equal to 60 dB	10,070	5,227	5,115	5,115	5,115
SOUTH BOSTON	Greater than or equal to 75 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 70 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 65 dB	1,043	66	98	98	66
SOUTH BOSTON	Greater than or equal to 60 dB	12,507	6,010	6,603	6,603	6,182
WINTHROP	Greater than or equal to 75 dB	510	199	77	77	164
WINTHROP	Greater than or equal to 70 dB	2,223	1,084	1,044	1,061	1,047
WINTHROP	Greater than or equal to 65 dB	7,880	4,291	4,256	4,256	4,012
WINTHROP	Greater than or equal to 60 dB	15,126	11,799	11,252	11,328	11,380
Population Summary						
All	Greater than or equal to 75 dB	568	257	77	77	222
All	Greater than or equal to 70 dB	6,380	1,521	1,382	1,459	1,445
All	Greater than or equal to 65 dB	34,386	17,531	17,677	17,909	16,892
All	Greater than or equal to 60 dB	86,164	59,523	59,752	59,916	58,374

* "BOSTON (OTHER)" includes Back Bay, Dorchester, Jamaica Plain, Roxbury, and the South End
Total counts do not include Deer Island or Long Island (institutional population only)

Table 1.2
Cumulative Population Summary by Town or Neighborhood
1999 29 Million Passenger High Fleet

Town	Sound Level	1993	No Action (Alt. 4)	All Actions (Alt. 1)	All Actions ex. PHP (Alt. 1A)	No Runway/ No Build (Alt. 2/3)
BOSTON (OTHER*)	Greater than or equal to 75 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 70 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 65 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 60 dB	3,270	0	0	0	0
CHELSEA	Greater than or equal to 75 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 70 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 65 dB	6,140	0	2,613	2,613	0
CHELSEA	Greater than or equal to 60 dB	13,357	6,906	8,966	9,112	7,069
EAST BOSTON	Greater than or equal to 75 dB	58	0	0	0	0
EAST BOSTON	Greater than or equal to 70 dB	2,822	157	295	295	58
EAST BOSTON	Greater than or equal to 65 dB	14,644	3,585	4,589	4,684	3,721
EAST BOSTON	Greater than or equal to 60 dB	28,780	17,162	19,355	19,355	18,315
E BOSTON (Jeff Pt.)	Greater than or equal to 75 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 70 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 65 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 60 dB	2,288	151	662	662	151
EVERETT	Greater than or equal to 75 dB	0	0	0	0	0
EVERETT	Greater than or equal to 70 dB	0	0	0	0	0
EVERETT	Greater than or equal to 65 dB	0	0	0	0	0
EVERETT	Greater than or equal to 60 dB	766	0	144	144	0
QUINCY	Greater than or equal to 75 dB	0	0	0	0	0
QUINCY	Greater than or equal to 70 dB	0	0	0	0	0
QUINCY	Greater than or equal to 65 dB	0	0	0	0	0
QUINCY	Greater than or equal to 60 dB	0	0	0	0	0
REVERE	Greater than or equal to 75 dB	0	0	0	0	0
REVERE	Greater than or equal to 70 dB	1,335	0	0	0	0
REVERE	Greater than or equal to 65 dB	4,679	3,091	2,340	2,471	2,896
REVERE	Greater than or equal to 60 dB	10,070	5,447	4,774	4,774	5,244
SOUTH BOSTON	Greater than or equal to 75 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 70 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 65 dB	1,043	18	55	80	18
SOUTH BOSTON	Greater than or equal to 60 dB	12,507	3,986	5,104	6,023	4,368
WINTHROP	Greater than or equal to 75 dB	510	164	0	0	77
WINTHROP	Greater than or equal to 70 dB	2,223	1,047	639	639	1,047
WINTHROP	Greater than or equal to 65 dB	7,880	3,710	2,914	2,932	3,334
WINTHROP	Greater than or equal to 60 dB	15,126	11,017	9,481	9,633	10,450
Population Summary						
All	Greater than or equal to 75 dB	568	164	0	0	77
All	Greater than or equal to 70 dB	6,380	1,204	934	934	1,105
All	Greater than or equal to 65 dB	34,386	10,404	12,511	12,780	9,969
All	Greater than or equal to 60 dB	86,164	44,669	48,486	49,703	45,597

* "BOSTON (OTHER)" includes Back Bay, Dorchester, Jamaica Plain, Roxbury, and the South End
Total counts do not include Deer Island or Long Island (institutional population only)

Table 1.3

Cumulative Population Summary by Town or Neighborhood
2010 37.5 Million Passenger Low Fleet

Town	Sound Level	1993	No Action (Alt. 4)	All Actions (Alt. 1)	All Actions ex. PHP (Alt. 1A)	No Runway/ No Build (Alt. 2/3)
BOSTON (OTHER*)	Greater than or equal to 75 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 70 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 65 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 60 dB	3,270	623	429	432	621
CHELSEA	Greater than or equal to 75 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 70 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 65 dB	6,140	0	1,807	1,807	0
CHELSEA	Greater than or equal to 60 dB	13,357	6,544	8,215	8,215	6,575
EAST BOSTON	Greater than or equal to 75 dB	58	58	0	58	58
EAST BOSTON	Greater than or equal to 70 dB	2,822	157	58	118	157
EAST BOSTON	Greater than or equal to 65 dB	14,644	3,412	3,197	3,197	3,412
EAST BOSTON	Greater than or equal to 60 dB	28,780	15,533	15,820	16,151	15,533
E BOSTON (Jeff Pt.)	Greater than or equal to 75 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 70 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 65 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 60 dB	2,288	582	662	662	151
EVERETT	Greater than or equal to 75 dB	0	0	0	0	0
EVERETT	Greater than or equal to 70 dB	0	0	0	0	0
EVERETT	Greater than or equal to 65 dB	0	0	0	0	0
EVERETT	Greater than or equal to 60 dB	766	0	144	144	0
QUINCY	Greater than or equal to 75 dB	0	0	0	0	0
QUINCY	Greater than or equal to 70 dB	0	0	0	0	0
QUINCY	Greater than or equal to 65 dB	0	0	0	0	0
QUINCY	Greater than or equal to 60 dB	0	0	0	0	0
REVERE	Greater than or equal to 75 dB	0	0	0	0	0
REVERE	Greater than or equal to 70 dB	1,335	1,047	0	0	689
REVERE	Greater than or equal to 65 dB	4,679	3,357	2,808	2,808	3,293
REVERE	Greater than or equal to 60 dB	10,070	5,826	4,603	4,603	5,575
SOUTH BOSTON	Greater than or equal to 75 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 70 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 65 dB	1,043	18	0	0	18
SOUTH BOSTON	Greater than or equal to 60 dB	12,507	2,002	4,232	4,029	2,008
WINTHROP	Greater than or equal to 75 dB	510	77	0	0	0
WINTHROP	Greater than or equal to 70 dB	2,223	1,004	612	612	830
WINTHROP	Greater than or equal to 65 dB	7,880	3,663	2,669	2,669	3,516
WINTHROP	Greater than or equal to 60 dB	15,126	10,846	9,442	9,487	10,320
Population Summary						
All	Greater than or equal to 75 dB	568	135	0	58	58
All	Greater than or equal to 70 dB	6,380	2,208	670	730	1,676
All	Greater than or equal to 65 dB	34,386	10,450	10,481	10,481	10,239
All	Greater than or equal to 60 dB	86,164	41,956	43,547	43,723	40,783

* "BOSTON (OTHER)" includes Back Bay, Dorchester, Jamaica Plain, Roxbury, and the South End
Total counts do not include Deer Island or Long Island (institutional population only)

Table 1.4

Cumulative Population Summary by Town or Neighborhood
2010 37.5 Million Passenger High Fleet

Town	Sound Level	1993	No Action (Alt. 4)	All Actions (Alt. 1)	All Actions ex. PHP (Alt. 1A)	No Runway/ No Build (Alt. 2/3)
BOSTON (OTHER*)	Greater than or equal to 75 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 70 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 65 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 60 dB	3,270	674	378	432	625
CHELSEA	Greater than or equal to 75 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 70 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 65 dB	6,140	0	2,064	1,415	0
CHELSEA	Greater than or equal to 60 dB	13,357	3,095	8,661	8,488	2,727
EAST BOSTON	Greater than or equal to 75 dB	58	58	58	58	58
EAST BOSTON	Greater than or equal to 70 dB	2,822	355	277	157	285
EAST BOSTON	Greater than or equal to 65 dB	14,644	3,006	4,269	4,247	2,452
EAST BOSTON	Greater than or equal to 60 dB	28,780	14,126	19,293	19,770	12,054
E BOSTON (Jeff Pt.)	Greater than or equal to 75 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 70 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 65 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 60 dB	2,288	662	582	1,230	151
EVERETT	Greater than or equal to 75 dB	0	0	0	0	0
EVERETT	Greater than or equal to 70 dB	0	0	0	0	0
EVERETT	Greater than or equal to 65 dB	0	0	0	0	0
EVERETT	Greater than or equal to 60 dB	766	0	238	0	0
QUINCY	Greater than or equal to 75 dB	0	0	0	0	0
QUINCY	Greater than or equal to 70 dB	0	0	0	0	0
QUINCY	Greater than or equal to 65 dB	0	0	0	0	0
QUINCY	Greater than or equal to 60 dB	0	0	0	0	0
REVERE	Greater than or equal to 75 dB	0	0	0	0	0
REVERE	Greater than or equal to 70 dB	1,335	2,260	172	172	1,823
REVERE	Greater than or equal to 65 dB	4,679	3,799	3,357	3,293	3,799
REVERE	Greater than or equal to 60 dB	10,070	8,472	6,079	5,658	7,690
SOUTH BOSTON	Greater than or equal to 75 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 70 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 65 dB	1,043	55	18	48	872
SOUTH BOSTON	Greater than or equal to 60 dB	12,507	3,094	6,338	6,002	3,418
WINTHROP	Greater than or equal to 75 dB	510	199	0	0	199
WINTHROP	Greater than or equal to 70 dB	2,223	1,213	764	699	1,213
WINTHROP	Greater than or equal to 65 dB	7,880	4,639	3,643	3,004	4,425
WINTHROP	Greater than or equal to 60 dB	15,126	11,536	10,457	10,071	11,365
Population Summary						
All	Greater than or equal to 75 dB	568	257	58	58	257
All	Greater than or equal to 70 dB	6,380	3,828	1,213	1,028	3,321
All	Greater than or equal to 65 dB	34,386	11,499	13,351	12,007	11,548
All	Greater than or equal to 60 dB	86,164	41,659	52,026	51,651	38,030

* "BOSTON (OTHER)" includes Back Bay, Dorchester, Jamaica Plain, Roxbury, and the South End
Total counts do not include Deer Island or Long Island (institutional population only)

Table 1.5

Cumulative Population Summary by Town or Neighborhood
2010 45 Million Passenger High Fleet

Town	Sound Level	1993	No Action (Alt. 4)	All Actions (Alt. 1)	All Actions ex. PHP (Alt. 1A)	No Runway/ No Build (Alt. 2/3)
BOSTON (OTHER*)	Greater than or equal to 75 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 70 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 65 dB	0	0	0	0	0
BOSTON (OTHER*)	Greater than or equal to 60 dB	3,270	1,739	621	1,003	1,003
CHELSEA	Greater than or equal to 75 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 70 dB	0	0	0	0	0
CHELSEA	Greater than or equal to 65 dB	6,140	0	1,807	392	0
CHELSEA	Greater than or equal to 60 dB	13,357	2,253	8,490	8,422	1,807
EAST BOSTON	Greater than or equal to 75 dB	58	58	58	58	58
EAST BOSTON	Greater than or equal to 70 dB	2,822	464	351	355	355
EAST BOSTON	Greater than or equal to 65 dB	14,644	4,334	4,306	4,320	3,502
EAST BOSTON	Greater than or equal to 60 dB	28,780	13,915	19,562	19,807	11,147
E BOSTON (Jeff Pt.)	Greater than or equal to 75 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 70 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 65 dB	0	0	0	0	0
E BOSTON (Jeff Pt.)	Greater than or equal to 60 dB	2,288	1,272	1,040	1,272	582
EVERETT	Greater than or equal to 75 dB	0	0	0	0	0
EVERETT	Greater than or equal to 70 dB	0	0	0	0	0
EVERETT	Greater than or equal to 65 dB	0	0	0	0	0
EVERETT	Greater than or equal to 60 dB	766	0	144	0	0
QUINCY	Greater than or equal to 75 dB	0	0	0	0	0
QUINCY	Greater than or equal to 70 dB	0	0	0	0	0
QUINCY	Greater than or equal to 65 dB	0	0	0	0	0
QUINCY	Greater than or equal to 60 dB	0	1,456	0	0	0
REVERE	Greater than or equal to 75 dB	0	0	0	0	0
REVERE	Greater than or equal to 70 dB	1,335	2,808	1,336	2,141	2,346
REVERE	Greater than or equal to 65 dB	4,679	4,603	3,606	3,854	3,884
REVERE	Greater than or equal to 60 dB	10,070	11,350	7,467	8,472	9,242
SOUTH BOSTON	Greater than or equal to 75 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 70 dB	0	0	0	0	0
SOUTH BOSTON	Greater than or equal to 65 dB	1,043	765	813	477	1,080
SOUTH BOSTON	Greater than or equal to 60 dB	12,507	4,417	8,227	9,410	4,341
WINTHROP	Greater than or equal to 75 dB	510	277	77	120	245
WINTHROP	Greater than or equal to 70 dB	2,223	1,770	1,064	1,144	1,522
WINTHROP	Greater than or equal to 65 dB	7,880	6,447	4,364	5,338	5,302
WINTHROP	Greater than or equal to 60 dB	15,126	13,942	11,252	11,918	13,461
Population Summary						
All	Greater than or equal to 75 dB	568	335	135	178	303
All	Greater than or equal to 70 dB	6,380	5,042	2,751	3,640	4,223
All	Greater than or equal to 65 dB	34,386	16,149	14,896	14,381	13,768
All	Greater than or equal to 60 dB	86,164	50,344	56,803	60,304	41,583

* "BOSTON (OTHER)" includes Back Bay, Dorchester, Jamaica Plain, Roxbury, and the South End
Total counts do not include Deer Island or Long Island (institutional population only)

Noise Metrics

A variety of noise metrics are used to assess airport noise impacts in different ways. Noise metrics may be used to describe individual noise events (such as a single operation of an aircraft taking off overhead) or groups of events (such as the cumulative effect of numerous aircraft operations, the collection of which creates a general noise environment, or overall noise exposure level). Both types of metrics are helpful in explaining how people are affected by a given noise condition. Massport uses both single-event and cumulative noise metrics to gain a full understanding of the Logan noise environment.

A-Weighted Sound Level.

The basic descriptor of the magnitude of sound is the value of its sound pressure. Sound pressure is a physical quantity which varies constantly in magnitude and in frequency. Because the range of the values of sound pressure is very large, acousticians adopted a logarithmic ratio scale to describe its magnitude. The unit on this logarithmic scale is the deciBel (dB). To match the unequal sensitivity of the human ear to different frequencies, standard filters have been developed for noise measuring equipment, causing the instruments to respond to sound pressures similar to the way in which we hear. The most common filter is the "A" weighting; it significantly de-emphasizes low frequencies (less than 500 Hertz (Hz)) and very high frequencies (above 10,000 Hz); and it relates well to our ability to hear speech. Sounds measured through this filter are referred to as A-weighted sound levels. The A-weighted dB is the most common sound unit used to evaluate all forms of noise impact on people.

Equivalent Sound Level.

Equivalent sound level (Leq) is the A-weighted sound level of a steady-state noise during a specified period of time containing the same amount of sound exposure as the varying sound level within that period of time. Leq is a metric for describing noise with fluctuating levels. As Leq is related to sound exposure rather than just sound pressure, averaging emphasizes the higher sound levels, and thus affords a good measure of high level intrusive noises. Also, because the sound exposure accounts for both sound level and duration, the Leq provides a good measure of long duration noise events. In this study the Leq is used to describe the nighttime sound level which is the summation of the sound exposure from all of the individual events that occur between the hours of 10:00 PM and 7:00 AM. Unlike DNL which includes both day and night sound levels, the nighttime Leq (LeqN) focuses only on the nighttime period, and does not include the 10 dB penalty surcharged on DNL levels.

Day-Night Sound Level (DNL).

The DNL is the A-weighted sound level of a steady-state noise during a 24-hour day which contains the same sound exposure as does the summation of the sound exposures from all of the individual events that occur during a 24-hour period, with the provision that noises occurring at night (defined as 10:00 PM through 7:00 AM) are increased by 10 dB. Actually, it is a 24-hour Leq, but adjusted with a nighttime penalty. This 10 dB penalty, or weighting, reflects the added intrusiveness of nighttime noise. Since community background noise typically decreases about 10 dB at night, nighttime noise events sound relatively louder because there is less ambient noise. Because DNL is based on an accumulation of total sound exposure, every noise event, regardless of level or duration, adds to its value.

Environmental sound levels can be measured or estimated. Measurements are practical only for obtaining existing DNL values for a relatively limited number of geographic locations and, in the absence of permanently installed monitors, only for a period of a few days. For this reason, most airport noise assessments use computer-generated DNL estimates of the noise contours for both existing and future conditions. Computation of DNL is accomplished by adding together the sound exposure level values of each individual aircraft flight that adds to the noise exposure at each location in the study area. In most airport studies, as in this study, the operations used in computing DNL represent an average day during a given year as determined by the statistical data maintained by Massport, the FAA, and other sources. The results are presented on maps as contours of equal cumulative sound (e.g., DNL values of 60, 65, 70 and 75 dB) and in tables for both DNL and other metrics at specific locations. They are generated by a program developed by the FAA known as the INM.

Maximum Sound Level.

The maximum sound level metric, Lmax, represents the highest sound level during a single noise event. During an aircraft flyby the sound level at a receptor increases during its approach from the time that it is first audible to its maximum level when the aircraft is nearest, or just past, the receptor. Then, as the aircraft flies away the sound level decreases until it is no longer audible. The total sound exposure during such a flyby is related to the sound pressure at the time the maximum sound level (Lmax) and to the duration of the time that the aircraft sound was audible.

Time Above a Given Noise Threshold.

Because analyses of sound levels (of any variety) are complex and often unfamiliar to the public, the FAA has developed a supplemental metric which describes the statistical distribution for the varying sound levels which together comprise the total noise environment. This descriptor accumulates the time that the sound level exceeds a selected A-weighted sound level threshold value. Every moment that the fluctuating sound level rises above the threshold, the number of seconds is accumulated and added to those acquired during previous periods. In this study these time-above-thresholds, or Time Above (TA), are reported in minutes for an average 24-hour period or just for nighttime periods between 10:00 PM and 7:00 AM. To provide a statistical picture of the noise environment the TA must be computed for several threshold values.

Logan 2015: Runway Use by INM Group After Delay Adjustments

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 04L Alt 1	Runway 04L Alt 1A	Runway 04L Alt 2/3	Runway 04L Alt 4	Runway 04R Alt 1	Runway 04R Alt 1A	Runway 04R Alt 2/3	Runway 04R Alt 4
Day	1	34.0%	37.7%	48.6%	49.8%	6.1%	6.1%	6.5%	6.3%
Night		17.5%	21.5%	30.5%	33.6%	14.5%	11.9%	13.1%	12.2%
Day	2	33.4%	35.4%	47.9%	46.8%	6.7%	8.5%	7.2%	9.3%
Night		14.8%	19.4%	27.4%	31.0%	17.0%	13.4%	15.8%	14.2%
Day	3	34.0%	37.7%	48.6%	49.8%	6.1%	6.1%	6.5%	6.3%
Night		23.9%	28.8%	39.1%	42.0%	11.2%	9.3%	10.0%	9.1%
Day	4	9.7%	12.6%	14.1%	16.7%	30.4%	31.3%	41.0%	39.5%
Night		4.7%	6.9%	8.6%	11.1%	26.9%	25.7%	34.1%	33.6%
Day	5	0.0%	0.0%	0.0%	0.0%	40.1%	43.9%	55.0%	56.2%
Night		0.0%	0.0%	0.0%	0.0%	31.8%	33.0%	43.1%	45.2%
Day	6	0.0%	0.0%	0.0%	0.0%	40.1%	43.9%	55.0%	56.2%
Night		0.0%	0.0%	0.0%	0.0%	31.1%	31.8%	41.7%	43.5%
Day	All	14.3%	17.2%	20.6%	22.7%	25.8%	26.7%	34.5%	33.4%
Night		6.1%	8.5%	11.2%	13.8%	25.6%	24.2%	31.6%	31.2%

	Departures Class	Runway 04L Alt 1	Runway 04L Alt 1A	Runway 04L Alt 2/3	Runway 04L Alt 4	Runway 04R Alt 1	Runway 04R Alt 1A	Runway 04R Alt 2/3	Runway 04R Alt 4
Day	1	33.7%	35.9%	46.6%	43.8%	0.2%	0.2%	0.3%	0.3%
Night		14.4%	20.5%	23.3%	26.2%	0.4%	0.4%	0.6%	0.6%
Day	2	0.0%	0.0%	0.0%	0.0%	1.7%	1.3%	2.7%	2.0%
Night		0.0%	0.0%	0.0%	0.0%	3.9%	3.1%	3.3%	2.4%
Day	3	33.4%	35.2%	46.2%	43.1%	0.2%	0.2%	0.3%	0.3%
Night		20.3%	25.6%	32.1%	33.1%	0.4%	0.3%	0.5%	0.5%
Day	4	0.0%	0.0%	0.0%	0.0%	1.7%	1.3%	2.7%	2.0%
Night		0.0%	0.0%	0.0%	0.0%	3.8%	3.1%	3.3%	2.4%
Day	5	0.0%	0.0%	0.0%	0.0%	40.1%	41.7%	54.9%	52.2%
Night		0.0%	0.0%	0.0%	0.0%	26.2%	26.8%	37.1%	36.1%
Day	6	0.0%	0.0%	0.0%	0.0%	1.7%	1.3%	2.7%	2.0%
Night		0.0%	0.0%	0.0%	0.0%	3.7%	3.0%	3.3%	2.4%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	0.0%	0.0%	0.0%	0.0%	27.7%	1.3%	37.3%	2.0%
Night		0.0%	0.0%	0.0%	0.0%	8.9%	3.7%	12.7%	2.5%
Day	9	0.0%	0.0%	0.0%	0.0%	40.1%	41.7%	54.9%	52.2%
Night		0.0%	0.0%	0.0%	0.0%	29.3%	30.7%	42.3%	41.5%
Day	All	4.4%	5.0%	6.1%	6.1%	6.0%	4.5%	8.6%	6.0%
Night		1.7%	2.4%	2.8%	3.2%	6.2%	5.1%	7.3%	5.4%

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 09 Alt 1	Runway 09 Alt 1A	Runway 09 Alt 2/3	Runway 09 Alt 4	Runway 14 Alt 1	Runway 14 Alt 1A	Runway 14 Alt 2/3	Runway 14 Alt 4
Day	1	0.9%	0.5%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%
Night		0.8%	0.7%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%
Day	2	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.3%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Day	3	1.0%	0.5%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Night		0.9%	0.7%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Day	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Day	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Day	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Day	All	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%

	Departures Class	Runway 09 Alt 1	Runway 09 Alt 1A	Runway 09 Alt 2/3	Runway 09 Alt 4	Runway 14 Alt 1	Runway 14 Alt 1A	Runway 14 Alt 2/3	Runway 14 Alt 4
Day	1	6.5%	8.0%	8.4%	12.5%	1.7%	1.1%	0.0%	0.0%
Night		19.0%	14.5%	20.6%	20.4%	2.1%	1.5%	0.0%	0.0%
Day	2	38.6%	42.7%	52.6%	54.6%	1.7%	1.1%	0.0%	0.0%
Night		30.0%	32.4%	41.4%	44.9%	2.0%	1.5%	0.0%	0.0%
Day	3	6.7%	8.7%	8.8%	13.2%	1.7%	1.1%	0.0%	0.0%
Night		15.2%	12.7%	16.1%	17.6%	2.0%	1.4%	0.0%	0.0%
Day	4	39.8%	43.4%	52.6%	54.6%	0.0%	0.0%	0.0%	0.0%
Night		31.2%	33.2%	41.6%	44.9%	0.0%	0.0%	0.0%	0.0%
Day	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	6	39.8%	43.3%	52.6%	54.6%	0.0%	0.0%	0.0%	0.0%
Night		31.6%	33.7%	42.3%	45.5%	0.1%	0.1%	0.0%	0.0%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	13.7%	43.4%	18.0%	54.6%	0.0%	0.0%	0.0%	0.0%
Night		24.6%	30.1%	28.7%	40.6%	0.0%	0.0%	0.0%	0.0%
Day	9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	All	30.6%	34.8%	40.6%	44.2%	0.4%	0.3%	0.0%	0.0%
Night		26.0%	27.7%	34.0%	37.6%	0.4%	0.3%	0.0%	0.0%

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 15L Alt 1	Runway 15L Alt 1A	Runway 15L Alt 2/3	Runway 15L Alt 4	Runway 15R Alt 1	Runway 15R Alt 1A	Runway 15R Alt 2/3	Runway 15R Alt 4
Day	1	0.2%	0.1%	0.1%	0.1%	0.8%	0.6%	0.2%	0.3%
Night		0.3%	0.3%	0.1%	0.1%	1.4%	0.8%	0.4%	0.4%
Day	2	0.0%	0.0%	0.0%	0.0%	1.5%	1.2%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	2.1%	1.7%	0.7%	0.6%
Day	3	0.0%	0.0%	0.0%	0.0%	0.9%	0.7%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	1.3%	0.9%	0.6%	0.6%
Day	4	0.0%	0.0%	0.0%	0.0%	1.8%	1.2%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	2.3%	1.8%	0.8%	0.6%
Day	5	0.0%	0.0%	0.0%	0.0%	1.8%	1.2%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	2.3%	1.7%	0.8%	0.6%
Day	6	0.0%	0.0%	0.0%	0.0%	1.8%	1.2%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	2.4%	1.8%	0.8%	0.6%
Day	All	0.0%	0.0%	0.0%	0.0%	1.6%	1.1%	0.4%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	2.2%	1.7%	0.8%	0.6%

	Departures Class	Runway 15L Alt 1	Runway 15L Alt 1A	Runway 15L Alt 2/3	Runway 15L Alt 4	Runway 15R Alt 1	Runway 15R Alt 1A	Runway 15R Alt 2/3	Runway 15R Alt 4
Day	1	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	9.8%	7.6%	7.2%	5.2%
Day	2	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	9.8%	7.6%	7.0%	5.1%
Day	3	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	6.9%	5.0%	4.5%	3.0%
Day	4	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	10.6%	8.3%	6.9%	5.1%
Day	5	0.0%	0.0%	0.0%	0.0%	2.1%	3.6%	0.6%	4.4%
Night		0.0%	0.0%	0.0%	0.0%	14.6%	13.7%	9.8%	10.8%
Day	6	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	10.0%	7.9%	6.5%	4.8%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	0.0%	0.0%	0.0%	0.0%	0.9%	0.6%	0.2%	0.2%
Night		0.0%	0.0%	0.0%	0.0%	12.9%	10.6%	9.3%	7.3%
Day	9	0.0%	0.0%	0.0%	0.0%	2.1%	3.6%	0.6%	4.4%
Night		0.0%	0.0%	0.0%	0.0%	11.8%	11.0%	7.1%	8.7%
Day	All	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.5%
Night		0.0%	0.0%	0.0%	0.0%	10.9%	8.7%	7.3%	5.7%

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 22L Alt 1	Runway 22L Alt 1A	Runway 22L Alt 2/3	Runway 22L Alt 4	Runway 22R Alt 1	Runway 22R Alt 1A	Runway 22R Alt 2/3	Runway 22R Alt 4
Day	1	13.6%	10.8%	36.5%	35.3%	0.7%	0.5%	1.2%	1.0%
Night		23.1%	23.9%	37.1%	36.9%	1.4%	0.7%	2.1%	1.4%
Day	2	5.2%	4.4%	13.1%	11.9%	0.0%	0.0%	0.0%	0.0%
Night		18.4%	20.5%	23.8%	22.5%	0.0%	0.0%	0.0%	0.0%
Day	3	14.3%	11.3%	37.7%	36.3%	0.0%	0.0%	0.0%	0.0%
Night		20.6%	18.7%	38.5%	37.3%	0.0%	0.0%	0.0%	0.0%
Day	4	7.3%	6.0%	18.9%	17.8%	0.0%	0.0%	0.0%	0.0%
Night		20.2%	22.2%	27.6%	26.7%	0.0%	0.0%	0.0%	0.0%
Day	5	1.7%	1.5%	3.0%	1.8%	0.0%	0.0%	0.0%	0.0%
Night		15.9%	18.6%	17.3%	16.1%	0.0%	0.0%	0.0%	0.0%
Day	6	13.3%	10.5%	34.9%	33.5%	0.0%	0.0%	0.0%	0.0%
Night		24.9%	26.4%	37.7%	37.1%	0.0%	0.0%	0.0%	0.0%
Day	All	8.3%	6.7%	21.4%	20.3%	0.0%	0.0%	0.1%	0.1%
Night		20.6%	22.4%	28.8%	28.0%	0.1%	0.0%	0.1%	0.1%

	Departures Class	Runway 22L Alt 1	Runway 22L Alt 1A	Runway 22L Alt 2/3	Runway 22L Alt 4	Runway 22R Alt 1	Runway 22R Alt 1A	Runway 22R Alt 2/3	Runway 22R Alt 4
Day	1	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.7%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	24.0%	24.0%	38.9%	38.1%
Day	2	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.7%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	23.8%	23.8%	38.9%	38.1%
Day	3	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.7%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	21.0%	19.5%	38.4%	37.3%
Day	4	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.6%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	23.7%	23.8%	38.9%	38.1%
Day	5	14.5%	11.6%	38.0%	36.7%	0.0%	0.0%	0.0%	0.0%
Night		27.7%	28.2%	43.0%	42.5%	0.0%	0.0%	0.0%	0.0%
Day	6	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.6%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	23.2%	23.2%	38.8%	38.0%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	0.0%	0.0%	0.0%	0.0%	14.4%	11.5%	37.6%	36.2%
Night		0.0%	0.0%	0.0%	0.0%	25.8%	27.7%	39.3%	39.0%
Day	9	14.5%	11.6%	38.0%	36.7%	0.0%	0.0%	0.0%	0.0%
Night		24.8%	23.7%	41.5%	40.5%	0.0%	0.0%	0.0%	0.0%
Day	All	1.2%	1.0%	3.3%	3.0%	13.2%	10.5%	34.4%	33.2%
Night		2.5%	2.4%	3.9%	3.7%	21.7%	22.0%	35.4%	34.8%

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 27 Alt 1	Alt 1A	Alt 2/3	Alt 4	Runway 32 Alt 1	Alt 1A	Alt 2/3	Alt 4
Day	1	0.6%	0.6%	0.4%	0.4%	42.2%	42.0%	0.0%	0.0%
Night		0.9%	0.7%	0.7%	0.6%	29.2%	30.2%	0.0%	0.0%
Day	2	10.4%	7.9%	24.9%	24.8%	37.4%	38.0%	0.0%	0.0%
Night		8.4%	6.0%	16.1%	16.5%	24.5%	26.3%	0.0%	0.0%
Day	3	0.6%	0.6%	0.4%	0.4%	42.5%	42.3%	0.0%	0.0%
Night		0.8%	0.7%	0.6%	0.5%	34.5%	35.8%	0.0%	0.0%
Day	4	9.6%	8.0%	19.1%	18.8%	11.0%	8.8%	0.0%	0.0%
Night		8.8%	7.5%	12.2%	12.3%	7.1%	5.2%	0.0%	0.0%
Day	5	15.7%	12.6%	35.0%	34.8%	0.0%	0.0%	0.0%	0.0%
Night		13.5%	10.6%	22.3%	22.8%	0.0%	0.0%	0.0%	0.0%
Day	6	4.2%	3.5%	3.1%	3.1%	0.0%	0.0%	0.0%	0.0%
Night		5.6%	4.5%	2.2%	2.2%	0.0%	0.0%	0.0%	0.0%
Day	All	8.3%	6.7%	16.5%	16.2%	16.7%	15.8%	0.0%	0.0%
Night		8.0%	6.5%	10.8%	10.9%	9.6%	8.9%	0.0%	0.0%

	Departures Class	Runway 27 Alt 1	Alt 1A	Alt 2/3	Alt 4	Runway 32 Alt 1	Alt 1A	Alt 2/3	Alt 4
Day	1	0.7%	0.6%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%
Night		0.9%	0.9%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%
Day	2	1.1%	3.8%	5.7%	5.8%	0.0%	0.0%	0.0%	0.0%
Night		1.4%	3.3%	7.1%	7.4%	0.0%	0.0%	0.0%	0.0%
Day	3	0.6%	0.8%	0.6%	0.8%	0.0%	0.0%	0.0%	0.0%
Night		0.8%	1.0%	0.8%	0.9%	0.0%	0.0%	0.0%	0.0%
Day	4	39.1%	39.4%	5.7%	5.8%	0.0%	0.0%	0.0%	0.0%
Night		24.1%	25.9%	7.1%	7.4%	0.0%	0.0%	0.0%	0.0%
Day	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	6	39.3%	39.7%	5.9%	6.0%	0.0%	0.0%	0.0%	0.0%
Night		25.2%	27.1%	7.2%	7.5%	0.0%	0.0%	0.0%	0.0%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	39.3%	39.7%	5.8%	6.0%	0.0%	0.0%	0.0%	0.0%
Night		21.1%	22.3%	7.8%	8.4%	0.0%	0.0%	0.0%	0.0%
Day	9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	All	26.4%	26.6%	4.6%	4.6%	0.0%	0.0%	0.0%	0.0%
Night		16.8%	18.1%	5.9%	6.1%	0.0%	0.0%	0.0%	0.0%

Logan 2015

* Runway use by INM group after delay adjustments

	Arrivals Class	Runway 33L Alt 1	Alt 1A	Alt 2/3	Alt 4	Runway 33R Alt 1	Alt 1A	Alt 2/3	Alt 4
Day	1	0.5%	0.4%	3.8%	4.2%	0.5%	0.5%	2.5%	2.4%
Night		10.2%	8.5%	12.6%	11.4%	0.7%	0.8%	3.1%	3.1%
Day	2	5.1%	4.7%	6.4%	6.7%	0.0%	0.0%	0.0%	0.0%
Night		14.6%	12.6%	16.2%	15.1%	0.0%	0.0%	0.0%	0.0%
Day	3	0.7%	0.7%	6.4%	6.6%	0.0%	0.0%	0.0%	0.0%
Night		6.8%	5.2%	11.3%	10.4%	0.0%	0.0%	0.0%	0.0%
Day	4	30.1%	32.1%	6.5%	6.7%	0.0%	0.0%	0.0%	0.0%
Night		29.9%	30.7%	16.7%	15.6%	0.0%	0.0%	0.0%	0.0%
Day	5	40.6%	40.8%	6.5%	6.6%	0.0%	0.0%	0.0%	0.0%
Night		36.3%	35.9%	16.4%	15.2%	0.0%	0.0%	0.0%	0.0%
Day	6	40.6%	40.8%	6.5%	6.6%	0.0%	0.0%	0.0%	0.0%
Night		36.0%	35.4%	17.5%	16.5%	0.0%	0.0%	0.0%	0.0%
Day	All	24.8%	25.5%	6.3%	6.5%	0.0%	0.0%	0.2%	0.2%
Night		27.7%	27.6%	16.3%	15.2%	0.0%	0.0%	0.2%	0.2%

	Departures Class	Runway 33L Alt 1	Alt 1A	Alt 2/3	Alt 4	Runway 33R Alt 1	Alt 1A	Alt 2/3	Alt 4
Day	1	42.6%	42.5%	6.2%	6.3%	0.0%	0.0%	0.0%	0.0%
Night		29.3%	30.5%	8.4%	8.5%	0.0%	0.0%	0.0%	0.0%
Day	2	42.2%	39.3%	1.1%	1.2%	0.0%	0.0%	0.0%	0.0%
Night		29.1%	28.2%	2.3%	2.1%	0.0%	0.0%	0.0%	0.0%
Day	3	42.7%	42.3%	6.3%	6.2%	0.0%	0.0%	0.0%	0.0%
Night		33.5%	34.7%	7.6%	7.5%	0.0%	0.0%	0.0%	0.0%
Day	4	4.3%	3.7%	1.1%	1.2%	0.0%	0.0%	0.0%	0.0%
Night		6.6%	5.7%	2.2%	2.1%	0.0%	0.0%	0.0%	0.0%
Day	5	43.3%	43.1%	6.6%	6.7%	0.0%	0.0%	0.0%	0.0%
Night		31.5%	31.4%	10.2%	10.6%	0.0%	0.0%	0.0%	0.0%
Day	6	4.0%	3.5%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%
Night		6.1%	5.1%	2.0%	1.8%	0.0%	0.0%	0.0%	0.0%
Day	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Night		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Day	8	4.0%	3.5%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%
Night		6.7%	5.7%	2.4%	2.2%	0.0%	0.0%	0.0%	0.0%
Day	9	43.3%	43.1%	6.6%	6.7%	0.0%	0.0%	0.0%	0.0%
Night		34.1%	34.5%	9.1%	9.3%	0.0%	0.0%	0.0%	0.0%
Day	All	16.9%	16.5%	2.2%	2.3%	0.0%	0.0%	0.0%	0.0%
Night		13.8%	13.3%	3.5%	3.5%	0.0%	0.0%	0.0%	0.0%

Logan 2015: Operations After Delay Adjustments

Logan 2015 Alternative 1A

* Operations after Delay Adjustments

EQUIP	INMTYPE	Total Arrivals	Day	Night	Class	Total Departures	Stagelength 1 Day	Night	Class	Stagelength 2 Day	Night	Class
CNA	BEC58P	9.24	8.53	0.71	1	9.24	8.49	0.75	1	0	0	0
BE1	DHC6	24.81	22.9	1.91	1	24.81	22.79	2.02	1	0	0	0
SF3	SF340	49.3	45.51	3.79	3	49.3	45.28	4.02	3	0	0	0
DH8	DHC8	2.38	2.2	0.18	3	2.38	2.19	0.19	3	0	0	0
ATR	DHC8	0.09	0.08	0	3	0.09	0.08	0	3	0	0	0
AT7	HS748A	3.09	2.85	0.23	3	3.09	2.84	0.25	3	0	0	0
328	CL600	58.47	48.13	10.34	2	58.47	33.14	4.75	2	18	2.58	2
ER3	CL601	30.65	25.22	5.43	4	30.65	15.85	2.27	4	10.97	1.57	4
CRJ	CL601	49.45	40.69	8.75	4	49.44	35.33	5.06	4	7.92	1.13	4
ER4	EMB145	105.92	87.18	18.75	4	105.92	36.78	5.27	4	55.87	8	4
CR7	CL601	3.24	2.67	0.57	4	3.24	1.84	0.26	4	1	0.14	4
728	CL601	1.62	1.33	0.29	4	1.62	0.91	0.14	4	0.49	0.08	4
ER7	CL601	3.24	2.67	0.57	4	3.24	1.84	0.26	4	1	0.14	4
100	F10065	0.86	0.71	0.16	4	0.86	0.05	0	4	0.7	0.11	4
AR1	BAE300	2.21	1.82	0.39	4	2.21	0.8	0.11	4	1.14	0.17	4
736	7373B2	8.93	7.35	1.58	4	8.93	3.21	0.46	4	3.96	0.57	4
735	737500	4.67	3.85	0.82	4	4.67	1.81	0.28	4	2.08	0.3	4
717	F10062	7.09	5.84	1.25	4	7.09	0	0	0	6.21	0.88	4
319	A320	26.04	21.44	4.6	4	26.04	13.62	1.95	4	5.17	0.74	4
737	737400	48.33	39.78	8.55	4	48.33	10.15	1.45	4	32.14	4.6	4
733	737300	3.53	1.94	1.59	4	3.53	1.98	0.83	4	0.35	0.15	4
733	7373B2	2.16	1.19	0.97	4	2.16	1.22	0.5	4	0.22	0.09	4
73H	737N9	12.45	11.85	0.6	4	12.45	9.42	0.48	4	1.68	0.09	4
738	737400	65.07	53.52	11.55	4	65.07	6.58	1.34	4	24.7	3.72	4
M83	MD82	6.83	5.63	1.2	4	6.83	2.21	0.31	4	1.27	0.18	4
M83	MD83	4.09	3.36	0.73	4	4.09	1.34	0.31	4	0.74	0.16	4
734	737400	3.91	3.22	0.69	4	3.91	2.94	0.42	4	0.48	0.06	4
320	A320	63.64	52.37	11.26	4	63.64	29	4.16	4	6.79	0.97	4
739	737400	5.04	4.15	0.89	4	5.04	0.39	0.06	4	1.49	0.22	4
757	757PW	22.03	18.13	3.9	5	22.03	1.93	0.29	6	6.92	1.01	6
757	757RR	12.94	10.65	2.29	5	12.94	1.13	0.17	6	4.06	0.6	6
321	A320	17.15	14.12	3.03	4	17.15	1.32	0.19	4	5.1	0.73	4
762	767CF6	6.26	5.17	1.09	6	6.26	0	0	0	0.01	0	8
762	767JT9	1.77	1.46	0.3	6	1.77	0	0	0	0	0	8
763	767CF6	8.29	6.82	1.47	6	8.29	0.89	0.12	8	3.13	0.45	8
763	767300	12.28	10.92	1.36	6	12.28	0.64	0.09	8	2.27	0.32	8
M11	MD11GE	0.65	0.55	0.1	6	0.65	0.01	0	9	0.11	0.04	9
M11	MD11PW	0.7	0.6	0.1	6	0.7	0.01	0.01	9	0.12	0.05	9
AB6	A300	0.75	0.63	0.12	6	0.75	0.02	0.01	8	0.1	0.07	8
764	767300	6.6	6.01	0.59	6	6.6	0.01	0	8	0.49	0.08	8
777	767JT9	2.21	1.99	0.22	6	2.21	0.01	0	8	0.2	0.03	8
772	767JT9	6.18	5.52	0.66	6	6.18	0.02	0	8	0.63	0.09	8
330	A310	0.92	0.76	0.16	6	0.92	0.01	0	8	0.21	0.03	8
773	767JT9	0.52	0.48	0.04	6	0.52	0	0	8	0.04	0	8
752	757RR	2.78	2.65	0.13	5	2.78	0	0	0	0	0	0
767	767CF6	0.14	0.13	0.01	6	0.14	0	0	0	0	0	0
767	767JT9	0.04	0.04	0	6	0.04	0	0	0	0	0	0
310	A310	0.69	0.66	0.03	6	0.69	0	0	0	0	0	0
346	DC870	1.1	1.05	0.05	6	1.1	0	0	0	0	0	0
332	A320	7.96	7.58	0.38	6	7.96	0	0	0	0	0	0
343	DC870	1.64	1.56	0.08	6	1.64	0	0	0	0	0	0
333	A310	2.39	2.27	0.12	6	2.39	0	0	0	0	0	0
744	747400	1.11	1.06	0.05	6	1.11	0	0	0	0	0	0
75F	757PW	1.88	1.44	0.44	5	1.88	0.79	0.06	6	0.71	0.05	6
72F	727EM2	4.37	0	4.37	4	4.37	0	1.97	4	0	1.79	5
76F	767300	4.87	1.12	3.76	6	4.87	0.62	1.58	8	0.56	1.44	8
30F	A300	3.09	0.71	2.39	6	3.09	0.39	1	8	0.35	0.91	8
D3F	DC1030	1.69	0.39	1.31	6	1.69	0.21	0.55	8	0.19	0.5	8
31F	A310	1.55	0.35	1.19	6	1.55	0.19	0.5	8	0.18	0.46	8
D1F	DC1010	1.48	0.34	1.15	6	1.48	0.19	0.48	8	0.17	0.44	8
LJF	LEAR35	0.85	0.19	0.65	2	0.85	0.24	0.61	2	0	0	0
M1F	MD11GE	0.76	0.17	0.59	6	0.76	0.1	0.24	9	0.09	0.22	9
33F	A310	0.64	0.14	0.49	6	0.64	0.08	0.2	8	0.08	0.18	8
GA2	LEAR35	31.07	27.06	4.01	2	31.07	27.19	3.88	2	0	0	0
GA1	BEC58P	19.68	14.34	5.35	1	19.68	15.27	4.41	1	0	0	0
GA5	CL601	3.66	3.19	0.47	4	3.66	3.2	0.46	4	0	0	0
GA3	CIT3	1.83	1.59	0.24	2	1.83	1.6	0.23	2	0	0	0
Total		**800.87**	**659.82**	**141.04**		**800.86**	**348.15**	**54.95**		**210.09**	**36.14**	

Stagelength 3			Stagelength 4			Stagelength 5			Stagelength 6			Stagelength 7		
Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.41	0.06	4	0.16	0.03	4	0.07	0.01	4	0	0	0	0	0	0
0	0	4	0.17	0.03	4	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.41	0.2	4	1.57	0.23	4	1	0.14	4	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0.15	0.07	4	0	0	0	0	0	0	0	0	0
0	0	0	0.1	0.04	4	0	0	0	0	0	0	0	0	0
0	0	0	0.74	0.04	4	0	0	0	0	0	0	0	0	0
0.16	0.11	4	10.59	1.54	4	14.28	2.04	5	0	0	0	0	0	0
1.05	0.15	4	1.46	0.2	5	0	0	0	0	0	0	0	0	0
0.58	0.11	4	0.75	0.12	5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.85	0.55	4	12.25	1.75	4	3.79	0.54	5	0	0	0	0	0	0
0.37	0.05	4	0.96	0.14	5	1.19	0.17	5	0	0	0	0	0	0
1.73	0.26	6	4.85	0.72	6	3.77	0.54	6	0	0	0	0	0	0
1.02	0.15	6	2.86	0.41	6	2.22	0.32	6	0	0	0	0	0	0
1.28	0.18	4	3.26	0.46	5	4.06	0.58	5	0	0	0	0	0	0
0	0	0	0.66	0.09	8	4.83	0.68	8	0	0	0	0	0	0
0	0	0	0.18	0.03	8	1.36	0.19	8	0	0	0	0	0	0
1.15	0.17	8	0.96	0.14	8	1.11	0.16	9	0	0	0	0	0	0
0.84	0.12	8	0.69	0.1	8	5.43	0.42	9	1.27	0.08	9	0	0	0
0.16	0.04	9	0.04	0	9	0.04	0.02	9	0.17	0.01	9	0	0	0
0.17	0.04	9	0.04	0.01	9	0.04	0.02	9	0.19	0.01	9	0	0	0
0.19	0.05	8	0.06	0.01	8	0.19	0.06	8	0.01	0	9	0	0	0
1.12	0.16	8	0.27	0.03	9	3.18	0.21	9	0.89	0.06	9	0.08	0	9
0.46	0.06	8	0.11	0.02	8	1.25	0.08	8	0	0	0	0	0	0
1.44	0.2	8	0.34	0.05	8	3.18	0.21	8	0	0	0	0	0	0
0.48	0.06	8	0.11	0.02	9	0	0	0	0	0	0	0	0	0
0.09	0.01	8	0.02	0	9	0.26	0.01	9	0.08	0	9	0.01	0	9
0	0	0	2.6	0.17	6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0.13	0.01	8	0	0	0
0	0	0	0	0	0	0	0	0	0.04	0	8	0	0	0
0	0	0	0.44	0.03	8	0.22	0.01	8	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.03	0.07	9
0	0	0	0	0	0	3.02	0.2	9	4.45	0.29	9	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.53	0.11	9
0	0	0	0	0	0	2.25	0.15	9	0	0	0	0	0	0
0	0	0	0	0	0	0.52	0.04	9	0	0	0	0.52	0.04	9
0.17	0.01	6	0.07	0	6	0	0	0	0	0	0	0	0	0
0	0.44	5	0	0.17	5	0	0	0	0	0	0	0	0	0
0.13	0.35	8	0.03	0.07	9	0.03	0.07	9	0	0	0	0	0	0
0.09	0.22	8	0.02	0.04	8	0.02	0.04	9	0	0	0	0	0	0
0.05	0.12	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0.05	0.11	8	0.01	0.02	8	0.01	0.02	9	0	0	0	0	0	0
0.04	0.1	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.02	0.05	9	0	0.01	9	0	0.01	9	0	0	0	0	0	0
0.02	0.04	8	0	0.01	9	0	0.01	9	.0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.53	**4.17**		**46.54**	**6.84**		**57.34**	**6.99**		**7.23**	**0.46**		**3.17**	**0.22**	

Logan 2015 Alternative 1

* Operations after Delay Adjustments

		Total				Total	Stagelength 1			Stagelength 2		
EQUIP	INMTYPE	Arrivals	Day	Night	Class	Departures	Day	Night	Class	Day	Night	Class
CNA	BEC58P	8.4	7.83	0.57	1	8.4	7.79	0.61	1	0	0	0
BE1	DHC6	22.92	21.39	1.53	1	22.92	21.27	1.65	1	0	0	0
SF3	SF340	46.3	43.22	3.08	3	46.3	42.99	3.31	3	0	0	0
DH8	DHC8	2.24	2.09	0.15	3	2.24	2.08	0.16	3	0	0	0
ATR	DHC8	0.08	0.08	0	3	0.08	0.08	0	3	0	0	0
AT7	HS748A	2.9	2.71	0.19	3	2.9	2.69	0.21	3	0	0	0
328	CL600	54.97	45.39	9.58	2	54.97	31.4	4.22	2	17.1	2.3	2
ER3	CL601	28.81	23.8	5.02	4	28.81	15.01	2.02	4	10.4	1.4	4
CRJ	CL601	47.22	39.09	8.13	4	47.22	34.06	4.52	4	7.63	1.01	4
ER4	EMB145	101.16	83.76	17.41	4	101.16	35.45	4.71	4	53.9	7.16	4
CR7	CL601	3.24	2.7	0.54	4	3.24	1.86	0.24	4	1.01	0.13	4
728	CL601	1.62	1.35	0.27	4	1.62	0.93	0.12	4	0.5	0.07	4
ER7	CL601	3.24	2.7	0.54	4	3.24	1.86	0.24	4	1.01	0.13	4
100	F10065	0.86	0.72	0.15	4	0.86	0.05	0	4	0.71	0.1	4
AR1	BAE300	2.21	1.84	0.37	4	2.21	0.81	0.1	4	1.16	0.15	4
736	7373B2	8.93	7.45	1.48	4	8.93	3.25	0.42	4	4.01	0.52	4
735	737500	4.67	3.9	0.77	4	4.67	1.83	0.26	4	2.1	0.28	4
717	F10062	7.09	5.91	1.18	4	7.09	0	0	0	6.29	0.8	4
319	A320	26.04	21.72	4.32	4	26.04	13.8	1.77	4	5.24	0.67	4
737	737400	48.33	40.31	8.02	4	48.33	10.28	1.32	4	32.6	4.18	4
733	737300	3.53	1.97	1.56	4	3.53	2.01	0.8	4	0.36	0.14	4
733	7373B2	2.16	1.21	0.95	4	2.16	1.23	0.49	4	0.22	0.09	4
73H	737N9	12.45	12.01	0.44	4	12.45	9.55	0.35	4	1.71	0.06	4
738	737400	65.07	54.24	10.83	4	65.07	6.67	1.25	4	25	3.39	4
M83	MD82	6.83	5.7	1.13	4	6.83	2.24	0.28	4	1.28	0.17	4
M83	MD83	4.09	3.41	0.68	4	4.09	1.36	0.29	4	0.75	0.15	4
734	737400	3.91	3.26	0.65	4	3.91	2.98	0.38	4	0.48	0.06	4
320	A320	63.64	53.07	10.56	4	63.64	29.39	3.77	4	6.88	0.88	4
739	737400	5.04	4.21	0.83	4	5.04	0.4	0.05	4	1.51	0.2	4
757	757PW	22.03	18.38	3.65	5	22.03	1.96	0.26	6	7.01	0.92	6
757	757RR	12.94	10.79	2.15	5	12.94	1.15	0.15	6	4.12	0.54	6
321	A320	17.15	14.3	2.85	4	17.15	1.34	0.17	4	5.17	0.66	4
762	767CF6	6.26	5.24	1.02	6	6.26	0	0	0	0.01	0	8
762	767JT9	1.77	1.48	0.28	6	1.77	0	0	0	0	0	8
763	767CF6	8.29	6.92	1.37	6	8.29	0.9	0.11	8	3.17	0.41	8
763	767300	12.28	11.06	1.22	6	12.28	0.65	0.08	8	2.3	0.29	8
M11	MD11GE	0.65	0.56	0.09	6	0.65	0.01	0	9	0.12	0.03	9
M11	MD11PW	0.7	0.61	0.09	6	0.7	0.01	0.01	9	0.13	0.04	9
AB6	A300	0.75	0.64	0.11	6	0.75	0.02	0.01	8	0.11	0.06	8
764	767300	6.6	6.09	0.51	6	6.6	0.01	0	8	0.5	0.07	8
777	767JT9	2.21	2.02	0.19	6	2.21	0.01	0	8	0.2	0.03	8
772	767JT9	6.18	5.59	0.59	6	6.18	0.02	0	8	0.64	0.08	8
330	A310	0.92	0.77	0.15	6	0.92	0.01	0	8	0.21	0.03	8
773	767JT9	0.52	0.48	0.04	6	0.52	0	0	8	0.04	0	8
752	757RR	2.78	2.68	0.1	5	2.78	0	0	0	0	0	0
767	767CF6	0.14	0.14	0	6	0.14	0	0	0	0	0	0
767	767JT9	0.04	0.04	0	6	0.04	0	0	0	0	0	0
310	A310	0.69	0.67	0.02	6	0.69	0	0	0	0	0	0
346	DC870	1.1	1.06	0.04	6	1.1	0	0	0	0	0	0
332	A320	7.96	7.68	0.28	6	7.96	0	0	0	0	0	0
343	DC870	1.64	1.58	0.06	6	1.64	0	0	0	0	0	0
333	A310	2.39	2.31	0.08	6	2.39	0	0	0	0	0	0
744	747400	1.11	1.07	0.04	6	1.11	0	0	0	0	0	0
75F	757PW	1.88	1.46	0.42	5	1.88	0.8	0.05	6	0.72	0.04	6
72F	727EM2	4.37	0	4.37	4	4.37	0	1.97	4	0	1.79	5
76F	767300	4.87	1.14	3.74	6	4.87	0.63	1.57	8	0.57	1.43	8
30F	A300	3.09	0.72	2.38	6	3.09	0.4	0.99	8	0.36	0.9	8
D3F	DC1030	1.69	0.4	1.3	6	1.69	0.21	0.55	8	0.19	0.5	8
31F	A310	1.55	0.36	1.18	6	1.55	0.19	0.5	8	0.18	0.46	8
D1F	DC1010	1.48	0.35	1.14	6	1.48	0.19	0.48	8	0.17	0.44	8
LJF	LEAR35	0.85	0.19	0.65	2	0.85	0.24	0.61	2	0	0	0
M1F	MD11GE	0.76	0.17	0.59	6	0.76	0.1	0.24	9	0.09	0.22	9
33F	A310	0.64	0.14	0.49	6	0.64	0.08	0.2	8	0.08	0.18	8
GA2	LEAR35	28.35	24.8	3.55	2	28.35	24.93	3.42	2	0	0	0
GA1	BEC58P	16.95	11.89	5.06	1	16.95	12.84	4.11	1	0	0	0
GA5	CL601	3.34	2.91	0.42	4	3.34	2.93	0.41	4	0	0	0
GA3	CIT3	1.67	1.46	0.21	2	1.67	1.47	0.2	2	0	0	0
Total		776.54	645.19	131.36		776.54	334.42	49.63		208	33.16	

Stagelength 3			Stagelength 4			Stagelength 5			Stagelength 6			Stagelength 7		
Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.41	0.06	4	0.16	0.03	4	0.07	0.01	4	0	0	0	0	0	0
0	0	4	0.17	0.03	4	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.43	0.18	4	1.59	0.21	4	1.01	0.13	4	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0.15	0.07	4	0	0	0	0	0	0	0	0	0
0	0	0	0.1	0.04	4	0	0	0	0	0	0	0	0	0
0	0	0	0.75	0.03	4	0	0	0	0	0	0	0	0	0
0.16	0.11	4	10.74	1.39	4	14.47	1.85	5	0	0	0	0	0	0
1.06	0.14	4	1.48	0.18	5	0	0	0	0	0	0	0	0	0
0.59	0.1	4	0.76	0.11	5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.9	0.5	4	12.41	1.59	4	3.84	0.49	5	0	0	0	0	0	0
0.38	0.04	4	0.97	0.13	5	1.21	0.15	5	0	0	0	0	0	0
1.76	0.23	6	4.92	0.65	6	3.82	0.49	6	0	0	0	0	0	0
1.03	0.14	6	2.89	0.38	6	2.25	0.29	6	0	0	0	0	0	0
1.29	0.17	4	3.3	0.42	5	4.11	0.53	5	0	0	0	0	0	0
0	0	0	0.67	0.08	8	4.89	0.62	8	0	0	0	0	0	0
0	0	0	0.18	0.03	8	1.38	0.17	8	0	0	0	0	0	0
1.17	0.15	8	0.97	0.13	8	1.13	0.14	9	0	0	0	0	0	0
0.85	0.11	8	0.7	0.09	8	5.5	0.35	9	1.28	0.07	9	0	0	0
0.16	0.04	9	0.04	0	9	0.04	0.02	9	0.17	0.01	9	0	0	0
0.17	0.04	9	0.04	0.01	9	0.04	0.02	9	0.19	0.01	9	0	0	0
0.19	0.05	8	0.06	0.01	8	0.19	0.06	8	0.01	0	9	0	0	0
1.14	0.14	8	0.27	0.03	9	3.22	0.17	9	0.91	0.04	9	0.08	0	9
0.46	0.06	8	0.12	0.01	8	1.26	0.07	8	0	0	0	0	0	0
1.46	0.18	8	0.35	0.04	8	3.22	0.17	8	0	0	0	0	0	0
0.48	0.06	8	0.12	0.01	9	0	0	0	0	0	0	0	0	0
0.09	0.01	8	0.02	0	9	0.26	0.01	9	0.08	0	9	0.01	0	9
0	0	0	2.63	0.14	6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0.14	0	8	0	0	0
0	0	0	0	0	0	0	0	0	0.04	0	8	0	0	0
0	0	0	0.44	0.03	8	0.22	0.01	8	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.04	0.06	9
0	0	0	0	0	0	3.06	0.16	9	4.5	0.24	9	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.55	0.09	9
0	0	0	0	0	0	2.28	0.12	9	0	0	0	0	0	0
0	0	0	0	0	0	0.53	0.03	9	0	0	0	0.53	0.03	9
0.17	0.01	6	0.07	0	6	0	0	0	0	0	0	0	0	0
0	0.44	5	0	0.17	5	0	0	0	0	0	0	0	0	0
0.14	0.34	8	0.03	0.07	9	0.03	0.07	9	0	0	0	0	0	0
0.09	0.22	8	0.02	0.04	8	0.02	0.04	9	0	0	0	0	0	0
0.05	0.12	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0.05	0.11	8	0.01	0.02	8	0.01	0.02	9	0	0	0	0	0	0
0.04	0.1	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.02	0.05	9	0	0.01	9	0	0.01	9	0	0	0	0	0	0
0.02	0.04	8	0	0.01	9	0	0.01	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.76	**3.94**		**47.15**	**6.23**		**58.08**	**6.25**		**7.32**	**0.37**		**3.21**	**0.18**	

Logan 2015 Alternative 4

* Operations after Delay Adjustments

		Total				Total	Stagelength 1			Stagelength 2			Stagelength 3		
EQUIP	INMTYPI	Arrivals	Day	Night	Class	Departu	Day	Night	Class	Day	Night	Class	Day	Night	Class
CNA	BEC58P	9.24	8.29	0.95	1	9.24	8.26	0.98	1	0	0	0	0	0	0
BE1	DHC6	24.81	22.27	2.54	1	24.81	22.16	2.65	1	0	0	0	0	0	0
SF3	SF340	49.3	44.26	5.04	3	49.3	44.04	5.26	3	0	0	0	0	0	0
DH8	DHC8	2.38	2.14	0.24	3	2.38	2.13	0.25	3	0	0	0	0	0	0
ATR	DHC8	0.09	0.07	0.01	3	0.09	0.07	0.01	3	0	0	0	0	0	0
AT7	HS748A	3.09	2.77	0.31	3	3.09	2.76	0.33	3	0	0	0	0	0	0
328	CL600	58.47	46.8	11.67	2	58.47	32.23	5.66	2	17.5	3.08	2	0	0	0
ER3	CL601	30.65	24.53	6.12	4	30.65	15.41	2.71	4	10.66	1.88	4	0	0	0
CRJ	CL601	49.45	39.57	9.87	4	49.44	34.36	6.03	4	7.7	1.35	4	0	0	0
ER4	EMB145	105.92	84.78	21.15	4	105.92	35.77	6.28	4	54.33	9.54	4	0	0	0
CR7	CL601	3.24	2.59	0.65	4	3.24	1.79	0.31	4	0.97	0.17	4	0	0	0
728	CL601	1.62	1.3	0.32	4	1.62	0.89	0.16	4	0.48	0.09	4	0	0	0
ER7	CL601	3.24	2.59	0.65	4	3.24	1.79	0.31	4	0.97	0.17	4	0	0	0
100	F10065	0.86	0.69	0.18	4	0.86	0.05	0	4	0.69	0.12	4	0	0	0
AR1	BAE300	2.21	1.77	0.44	4	2.21	0.78	0.13	4	1.11	0.2	4	0	0	0
736	7373B2	8.93	7.15	1.78	4	8.93	3.12	0.55	4	3.85	0.68	4	0.4	0.07	4
735	737500	4.67	3.74	0.93	4	4.67	1.76	0.33	4	2.02	0.36	4	0	0	4
717	F10062	7.09	5.67	1.42	4	7.09	0	0	0	6.04	1.05	4	0	0	0
319	A320	26.04	20.85	5.19	4	26.04	13.25	2.32	4	5.03	0.88	4	1.37	0.24	4
737	737400	48.33	38.69	9.64	4	48.33	9.87	1.73	4	31.25	5.49	4	0	0	0
733	737300	3.53	1.89	1.64	4	3.53	1.93	0.88	4	0.34	0.16	4	0	0	0
733	7373B2	2.16	1.16	1	4	2.16	1.18	0.54	4	0.21	0.1	4	0	0	0
73H	737N9	12.45	11.52	0.93	4	12.45	9.16	0.74	4	1.64	0.13	4	0	0	0
738	737400	65.07	52.05	13.02	4	65.07	6.4	1.52	4	24.02	4.4	4	0.16	0.11	4
M83	MD82	6.83	5.47	1.36	4	6.83	2.15	0.37	4	1.23	0.22	4	1.02	0.18	4
M83	MD83	4.09	3.27	0.82	4	4.09	1.31	0.34	4	0.72	0.18	4	0.56	0.13	4
734	737400	3.91	3.13	0.78	4	3.91	2.86	0.5	4	0.46	0.08	4	0	0	0
320	A320	63.64	50.93	12.7	4	63.64	28.21	4.95	4	6.6	1.16	4	3.74	0.66	4
739	737400	5.04	4.04	1	4	5.04	0.38	0.07	4	1.45	0.26	4	0.36	0.06	4
757	757PW	22.03	17.63	4.4	5	22.03	1.88	0.34	6	6.73	1.2	6	1.68	0.31	6
757	757RR	12.94	10.36	2.58	5	12.94	1.1	0.2	6	3.95	0.71	6	0.99	0.18	6
321	A320	17.15	13.73	3.42	4	17.15	1.29	0.22	4	4.96	0.87	4	1.24	0.22	4
762	767CF6	6.26	5.03	1.23	6	6.26	0	0	0	0.01	0	8	0	0	0
762	767JT9	1.77	1.42	0.34	6	1.77	0	0	0	0	0	8	0	0	0
763	767CF6	8.29	6.64	1.65	6	8.29	0.86	0.15	8	3.05	0.53	8	1.12	0.2	8
763	767300	12.28	10.62	1.66	6	12.28	0.62	0.11	8	2.2	0.39	8	0.81	0.15	8
M11	MD11GE	0.65	0.54	0.11	6	0.65	0.01	0	9	0.11	0.04	9	0.16	0.04	9
M11	MD11PV	0.7	0.58	0.12	6	0.7	0.01	0.01	9	0.12	0.05	9	0.17	0.04	9
AB6	A300	0.75	0.61	0.14	6	0.75	0.02	0.01	8	0.1	0.07	8	0.19	0.05	8
764	767300	6.6	5.84	0.76	6	6.6	0.01	0	8	0.48	0.09	8	1.09	0.19	8
777	767JT9	2.21	1.93	0.28	6	2.21	0.01	0	8	0.19	0.04	8	0.44	0.08	8
772	767JT9	6.18	5.37	0.81	6	6.18	0.02	0	8	0.61	0.11	8	1.4	0.24	8
330	A310	0.92	0.74	0.18	6	0.92	0.01	0	8	0.2	0.04	8	0.46	0.08	8
773	767JT9	0.52	0.46	0.06	6	0.52	0	0	8	0.04	0	8	0.08	0.02	8
752	757RR	2.78	2.57	0.21	5	2.78	0	0	0	0	0	0	0	0	0
767	767CF6	0.14	0.13	0.01	6	0.14	0	0	0	0	0	0	0	0	0
767	767JT9	0.04	0.04	0	6	0.04	0	0	0	0	0	0	0	0	0
310	A310	0.69	0.64	0.05	6	0.69	0	0	0	0	0	0	0	0	0
346	DC870	1.1	1.02	0.08	6	1.1	0	0	0	0	0	0	0	0	0
332	A320	7.96	7.37	0.59	6	7.96	0	0	0	0	0	0	0	0	0
343	DC870	1.64	1.52	0.12	6	1.64	0	0	0	0	0	0	0	0	0
333	A310	2.39	2.21	0.18	6	2.39	0	0	0	0	0	0	0	0	0
744	747400	1.11	1.03	0.08	6	1.11	0	0	0	0	0	0	0	0	0
75F	757PW	1.88	1.4	0.48	5	1.88	0.77	0.08	6	0.69	0.07	6	0.17	0.01	6
72F	727EM2	4.37	0	4.37	4	4.37	0	1.97	4	0	1.79	5	0	0.44	5
76F	767300	4.87	1.09	3.79	6	4.87	0.6	1.6	8	0.55	1.45	8	0.13	0.35	8
30F	A300	3.09	0.69	2.41	6	3.09	0.38	1.01	8	0.34	0.92	8	0.08	0.23	8
D3F	DC1030	1.69	0.38	1.32	6	1.69	0.2	0.56	8	0.19	0.5	8	0.05	0.12	9
31F	A310	1.55	0.34	1.2	6	1.55	0.19	0.5	8	0.18	0.46	8	0.05	0.11	8
D1F	DC1010	1.48	0.33	1.16	6	1.48	0.19	0.48	8	0.17	0.44	8	0.04	0.1	9
LJF	LEAR35	0.85	0.19	0.65	2	0.85	0.23	0.62	2	0	0	0	0	0	0
M1F	MD11GE	0.76	0.17	0.59	6	0.76	0.09	0.25	9	0.08	0.23	9	0.02	0.05	9
33F	A310	0.64	0.14	0.49	6	0.64	0.07	0.21	8	0.07	0.19	8	0.02	0.04	8
GA2	LEAR35	31.07	26.32	4.75	2	31.07	26.44	4.63	2	0	0	0	0	0	0
GA1	BEC58P	19.68	13.95	5.74	1	19.68	14.85	4.83	1	0	0	0	0	0	0
GA5	CL601	3.66	3.1	0.56	4	3.66	3.11	0.55	4	0	0	0	0	0	0
GA3	CIT3	1.83	1.55	0.28	2	1.83	1.56	0.27	2	0	0	0	0	0	0
Total		**800.87**	**641.66**	**159.2**		**800.86**	**338.59**	**64.51**		**204.29**	**41.94**		**18**	**4.7**	

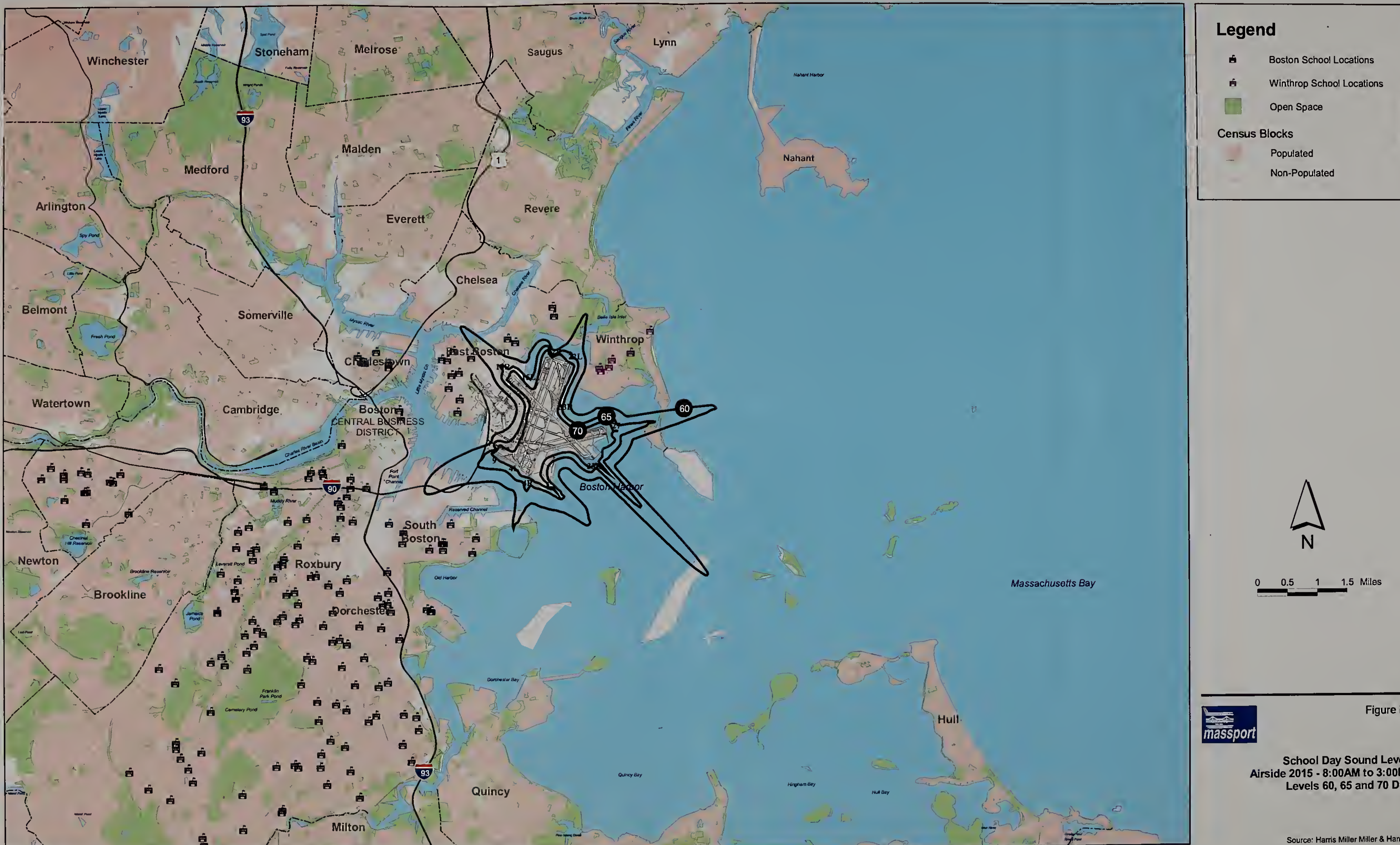
Stagelength 4			Stagelength 5			Stagelength 6			Stagelength 7		
Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0.16	0.03	4	0.06	0.02	4	0	0	0	0	0	0
0.17	0.03	4	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
1.53	0.27	4	0.97	0.17	4	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0.15	0.07	4	0	0	0	0	0	0	0	0	0
0.09	0.05	4	0	0	0	0	0	0	0	0	0
0.72	0.06	4	0	0	0	0	0	0	0	0	0
10.3	1.83	4	13.89	2.43	5	0	0	0	0	0	0
1.42	0.24	5	0	0	0	0	0	0	0	0	0
0.73	0.14	5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
11.91	2.09	4	3.68	0.65	5	0	0	0	0	0	0
0.93	0.17	5	1.16	0.2	5	0	0	0	0	0	0
4.72	0.85	6	3.67	0.64	6	0	0	0	0	0	0
2.78	0.49	6	2.16	0.38	6	0	0	0	0	0	0
3.17	0.55	5	3.94	0.7	5	0	0	0	0	0	0
0.64	0.11	8	4.69	0.82	8	0	0	0	0	0	0
0.18	0.03	8	1.32	0.23	8	0	0	0	0	0	0
0.93	0.17	8	1.08	0.19	9	0	0	0	0	0	0
0.68	0.11	8	5.28	0.57	9	1.23	0.12	9	0	0	0
0.04	0	9	0.04	0.02	9	0.17	0.01	9	0	0	0
0.04	0.01	9	0.04	0.02	9	0.19	0.01	9	0	0	0
0.06	0.01	8	0.19	0.06	8	0.01	0	9	0	0	0
0.26	0.04	9	3.09	0.3	9	0.87	0.08	9	0.07	0.01	9
0.11	0.02	8	1.21	0.12	8	0	0	0	0	0	0
0.33	0.06	8	3.09	0.3	8	0	0	0	0	0	0
0.11	0.02	9	0	0	0	0	0	0	0	0	0
0.02	0	9	0.25	0.02	9	0.07	0.01	9	0.01	0	9
2.53	0.24	6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.13	0.01	8	0	0	0
0	0	0	0	0	0	0.04	0	8	0	0	0
0.43	0.04	8	0.21	0.02	8	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0.1	9
0	0	0	2.93	0.29	9	4.32	0.42	9	0	0	0
0	0	0	0	0	0	0	0	0	1.49	0.15	9
0	0	0	2.18	0.22	9	0	0	0	0	0	0
0	0	0	0.51	0.05	9	0	0	0	0.51	0.05	9
0.06	0.01	6	0	0	0	0	0	0	0	0	0
0	0.17	5	0	0	0	0	0	0	0	0	0
0.03	0.07	9	0.03	0.07	9	0	0	0	0	0	0
0.02	0.04	8	0.02	0.04	9	0	0	0	0	0	0
0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0.01	0.02	8	0.01	0.02	9	0	0	0	0	0	0
0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0.01	9	0	0.01	9	0	0	0	0	0	0
0	0.01	9	0	0.01	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
45.28	**8.1**		**55.72**	**8.61**		**7.03**	**0.66**		**3.08**	**0.31**	

Logan 2015 Alternative 2 / 3

* Operations after Delay Adjustments

EQUIP	INMTYPE	Total Arrivals	Day	Night	Class	Total Departures	Stagelength 1 Day	Night	Class	Stagelength 2 Day	Night	Class
CNA	BEC58P	8.4	7.66	0.74	1	8.4	7.62	0.78	1	0	0	0
BE1	DHC6	22.92	20.91	2.01	1	22.92	20.8	2.12	1	0	0	0
SF3	SF340	46.3	42.27	4.03	3	46.3	42.04	4.26	3	0	0	0
DH8	DHC8	2.24	2.05	0.19	3	2.24	2.04	0.2	3	0	0	0
ATR	DHC8	0.08	0.08	0	3	0.08	0.08	0	3	0	0	0
AT7	HS748A	2.9	2.65	0.25	3	2.9	2.63	0.27	3	0	0	0
328	CL600	54.97	44.39	10.58	2	54.97	30.7	4.92	2	16.68	2.67	2
ER3	CL601	28.81	23.27	5.55	4	28.81	14.68	2.35	4	10.16	1.63	4
CRJ	CL601	47.22	38.23	8.99	4	47.22	33.31	5.27	4	7.46	1.18	4
ER4	EMB145	101.16	81.9	19.27	4	101.16	34.67	5.49	4	52.66	8.35	4
CR7	CL601	3.24	2.64	0.6	4	3.24	1.82	0.28	4	0.99	0.15	4
728	CL601	1.62	1.32	0.3	4	1.62	0.91	0.14	4	0.49	0.08	4
ER7	CL601	3.24	2.64	0.6	4	3.24	1.82	0.28	4	0.99	0.15	4
100	F10065	0.86	0.71	0.16	4	0.86	0.05	0	4	0.7	0.11	4
AR1	BAE300	2.21	1.8	0.41	4	2.21	0.79	0.12	4	1.13	0.18	4
736	7373B2	8.93	7.28	1.65	4	8.93	3.18	0.49	4	3.92	0.61	4
735	737500	4.67	3.81	0.86	4	4.67	1.79	0.3	4	2.06	0.32	4
717	F10062	7.09	5.78	1.31	4	7.09	0	0	0	6.15	0.94	4
319	A320	26.04	21.24	4.8	4	26.04	13.5	2.07	4	5.12	0.79	4
737	737400	48.33	39.42	8.91	4	48.33	10.06	1.54	4	31.85	4.89	4
733	737300	3.53	1.92	1.61	4	3.53	1.96	0.85	4	0.35	0.15	4
733	7373B2	2.16	1.18	0.98	4	2.16	1.21	0.51	4	0.22	0.09	4
73H	737N9	12.45	11.74	0.71	4	12.45	9.34	0.56	4	1.67	0.1	4
738	737400	65.07	53.04	12.03	4	65.07	6.52	1.4	4	24.48	3.94	4
M83	MD82	6.83	5.57	1.26	4	6.83	2.19	0.33	4	1.25	0.2	4
M83	MD83	4.09	3.33	0.76	4	4.09	1.33	0.32	4	0.74	0.16	4
734	737400	3.91	3.19	0.72	4	3.91	2.91	0.45	4	0.47	0.07	4
320	A320	63.64	51.9	11.73	4	63.64	28.74	4.42	4	6.73	1.03	4
739	737400	5.04	4.11	0.93	4	5.04	0.39	0.06	4	1.48	0.23	4
757	757PW	22.03	17.97	4.06	5	22.03	1.91	0.31	6	6.86	1.07	6
757	757RR	12.94	10.56	2.38	5	12.94	1.12	0.18	6	4.03	0.63	6
321	A320	17.15	13.99	3.16	4	17.15	1.31	0.2	4	5.06	0.77	4
762	767CF6	6.26	5.12	1.14	6	6.26	0	0	0	0.01	0	8
762	767JT9	1.77	1.44	0.32	6	1.77	0	0	0	0	0	8
763	767CF6	8.29	6.76	1.53	6	8.29	0.88	0.13	8	3.1	0.48	8
763	767300	12.28	10.82	1.46	6	12.28	0.63	0.1	8	2.24	0.35	8
M11	MD11GE	0.65	0.55	0.1	6	0.65	0.01	0	9	0.11	0.04	9
M11	MD11PW	0.7	0.59	0.11	6	0.7	0.01	0.01	9	0.12	0.05	9
AB6	A300	0.75	0.62	0.13	6	0.75	0.02	0.01	8	0.1	0.07	8
764	767300	6.6	5.95	0.65	6	6.6	0.01	0	8	0.49	0.08	8
777	767JT9	2.21	1.97	0.24	6	2.21	0.01	0	8	0.2	0.03	8
772	767JT9	6.18	5.47	0.71	6	6.18	0.02	0	8	0.62	0.1	8
330	A310	0.92	0.75	0.17	6	0.92	0.01	0	8	0.21	0.03	8
773	767JT9	0.52	0.47	0.05	6	0.52	0	0	8	0.04	0	8
752	757RR	2.78	2.62	0.16	5	2.78	0	0	0	0	0	0
767	767CF6	0.14	0.13	0.01	6	0.14	0	0	0	0	0	0
767	767JT9	0.04	0.04	0	6	0.04	0	0	0	0	0	0
310	A310	0.69	0.65	0.04	6	0.69	0	0	0	0	0	0
346	DC870	1.1	1.04	0.06	6	1.1	0	0	0	0	0	0
332	A320	7.96	7.51	0.45	6	7.96	0	0	0	0	0	0
343	DC870	1.64	1.55	0.09	6	1.64	0	0	0	0	0	0
333	A310	2.39	2.25	0.14	6	2.39	0	0	0	0	0	0
744	747400	1.11	1.05	0.06	6	1.11	0	0	0	0	0	0
75F	757PW	1.88	1.42	0.46	5	1.88	0.78	0.07	6	0.71	0.05	6
72F	727EM2	4.37	0	4.37	4	4.37	0	1.97	4	0	1.79	5
76F	767300	4.87	1.11	3.77	6	4.87	0.61	1.59	8	0.56	1.44	8
30F	A300	3.09	0.71	2.39	6	3.09	0.39	1	8	0.35	0.91	8
D3F	DC1030	1.69	0.39	1.31	6	1.69	0.21	0.55	8	0.19	0.5	8
31F	A310	1.55	0.35	1.19	6	1.55	0.19	0.5	8	0.18	0.46	8
D1F	DC1010	1.48	0.34	1.15	6	1.48	0.19	0.48	8	0.17	0.44	8
LJF	LEAR35	0.85	0.19	0.65	2	0.85	0.24	0.61	2	0	0	0
M1F	MD11GE	0.76	0.17	0.59	6	0.76	0.09	0.25	9	0.08	0.23	9
33F	A310	0.64	0.14	0.49	6	0.64	0.08	0.2	8	0.08	0.18	8
GA2	LEAR35	28.35	24.25	4.1	2	28.35	24.37	3.98	2	0	0	0
GA1	BEC58P	16.95	11.63	5.32	1	16.95	12.56	4.39	1	0	0	0
GA5	CL601	3.34	2.85	0.48	4	3.34	2.87	0.47	4	0	0	0
GA3	CIT3	1.67	1.42	0.25	2	1.67	1.43	0.24	2	0	0	0
Total		**776.54**	**630.87**	**145.68**		**776.54**	**327.03**	**57.02**		**203.26**	**37.72**	

	Stagelength 3			Stagelength 4			Stagelength 5			Stagelength 6			Stagelength 7	
Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class	Day	Night	Class
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.41	0.06	4	0.16	0.03	4	0.07	0.01	4	0	0	0	0	0	0
0	0	4	0.17	0.03	4	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4	0.21	4	1.56	0.24	4	0.99	0.15	4	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0.15	0.07	4	0	0	0	0	0	0	0	0	0
0	0	0	0.09	0.05	4	0	0	0	0	0	0	0	0	0
0	0	0	0.74	0.04	4	0	0	0	0	0	0	0	0	0
0.16	0.11	4	10.5	1.63	4	14.15	2.17	5	0	0	0	0	0	0
1.04	0.16	4	1.44	0.22	5	0	0	0	0	0	0	0	0	0
0.58	0.11	4	0.75	0.12	5	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.81	0.59	4	12.14	1.86	4	3.75	0.58	5	0	0	0	0	0	0
0.37	0.05	4	0.95	0.15	5	1.18	0.18	5	0	0	0	0	0	0
1.72	0.27	6	4.81	0.76	6	3.74	0.57	6	0	0	0	0	0	0
1.01	0.16	6	2.83	0.44	6	2.2	0.34	6	0	0	0	0	0	0
1.26	0.2	4	3.23	0.49	5	4.02	0.62	5	0	0	0	0	0	0
0	0	0	0.65	0.1	8	4.78	0.73	8	0	0	0	0	0	0
0	0	0	0.18	0.03	8	1.35	0.2	8	0	0	0	0	0	0
1.14	0.18	8	0.95	0.15	8	1.1	0.17	9	0	0	0	0	0	0
0.83	0.13	8	0.69	0.1	8	5.38	0.47	9	1.25	0.1	9	0	0	0
0.16	0.04	9	0.04	0	9	0.04	0.02	9	0.17	0.01	9	0	0	0
0.17	0.04	9	0.04	0.01	9	0.04	0.02	9	0.19	0.01	9	0	0	0
0.19	0.05	8	0.06	0.01	8	0.19	0.06	8	0.01	0	9	0	0	0
1.11	0.17	8	0.26	0.04	9	3.15	0.24	9	0.89	0.06	9	0.08	0	9
0.45	0.07	8	0.11	0.02	8	1.24	0.09	8	0	0	0	0	0	0
1.42	0.22	8	0.34	0.05	8	3.15	0.24	8	0	0	0	0	0	0
0.47	0.07	8	0.11	0.02	9	0	0	0	0	0	0	0	0	0
0.08	0.02	8	0.02	0	9	0.25	0.02	9	0.08	0	9	0.01	0	9
0	0	0	2.58	0.19	6	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0.13	0.01	8	0	0	0
0	0	0	0	0	0	0	0	0	0.04	0	8	0	0	0
0	0	0	0.43	0.04	8	0.22	0.01	8	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.02	0.08	9
0	0	0	0	0	0	2.99	0.23	9	4.41	0.33	9	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1.52	0.12	9
0	0	0	0	0	0	2.23	0.17	9	0	0	0	0	0	0
0	0	0	0	0	0	0.52	0.04	9	0	0	0	0.52	0.04	9
0.17	0.01	6	0.07	0	6	0	0	0	0	0	0	0	0	0
0	0.44	5	0	0.17	5	0	0	0	0	0	0	0	0	0
0.13	0.35	8	0.03	0.07	9	0.03	0.07	9	0	0	0	0	0	0
0.08	0.23	8	0.02	0.04	8	0.02	0.04	9	0	0	0	0	0	0
0.05	0.12	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0.05	0.11	8	0.01	0.02	8	0.01	0.02	9	0	0	0	0	0	0
0.04	0.1	9	0.01	0.02	9	0.01	0.02	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.02	0.05	9	0	0.01	9	0	0.01	9	0	0	0	0	0	0
0.02	0.04	8	0	0.01	9	0	0.01	9	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.34	4.36		46.13	7.25		56.81	7.52		7.17	0.52		3.15	0.24	



massport

Figure E-1

School Day Sound Levels
Airside 2015 - 8:00AM to 3:00PM
Levels 60, 65 and 70 DNL

Source: Harris Miller Miller & Hanson

Appendix F
Air Quality

- F.1 Comparison of Air Quality Modeling Results for the 29M Low Scenario, Alternative 1/1A LDMS vs. EDMS Modeling
- F.2 Aircraft Fleet Used for EDMS Modeling
- F.3 2015 RJ Fleet – Emission Inventory Result
- F.4 2015 RJ Fleet – Dispersion Modeling Results
- F.5 Comparison of Air Quality Results for All Alternatives Excerpted from the Draft EIR/EIS

Comparison of Air Quality Modeling Results

Comparison of Air Quality Modeling Results for the 29M Low Scenario, Alternative 1/1 A

	2nd Maximum CO (1-hour)			2nd Maximum N02 (1-hour)			2nd Maximum CO (8-hour)			2nd Maximum PM-10 (24-hour)			AnnualMean NO_2			AnnualMean PM-10		
Receptor	LDMS	EDMS	Std.	LDMS	EDMS	Std.	LDMS	EDMS	Std.	LDMS	EDMS	Std.	LDMS	EDMS	Std.	LDMS	EDMS	Std.
Annavoy & Baywater	4,162	3,964	40,000	215	194	320	2,273	2,186	10,000	46	45	150	54	54	100	23	23	50
Broadway & C	3,740	3,692	40,000	192	176	320	2,113	2,158	10,000	45	45	150	53	53	100	23	23	50
Constitution Beach	4,420	5,241	40,000	211	212	320	2,293	2,690	10,000	46	46	150	54	54	100	23	23	50
Cottage Park	3,787	3,747	40,000	198	191	320	2,135	2,205	10,000	46	45	150	54	54	100	23	23	50
Court & Loring	4,225	3,657	40,000	203	175	320	2,279	2,147	10,000	46	46	150	54	54	100	23	23	50
Eagle Hill	4,421	4,291	40,000	215	212	320	2,345	2,486	10,000	46	46	150	54	54	100	23	23	50
Farragut & 1st	4,140	3,935	40,000	199	182	320	2,207	2,290	10,000	46	45	150	54	53	100	23	23	50
Grandview & Baysview	3,814	4,000	40,000	195	204	320	2,179	2,193	10,000	46	45	150	54	53	100	23	23	50
Jeffries Point	5,676	4,821	40,000	255	203	320	2,734	2,515	10,000	48	46	150	55	55	100	24	23	50
Orient Heights	4,141	4,686	40,000	196	201	320	2,204	2,481	10,000	46	46	150	54	53	100	23	23	50
Revere Beach	3,830	3,685	40,000	185	176	320	2,147	2,107	10,000	46	45	150	53	53	100	23	23	50
Union Park	4,024	3,706	40,000	188	177	320	2,176	2,132	10,000	45	45	150	53	53	100	23	23	50

All values are given in $\mu g/m^3$.

LDMS is the Logan Dispersion Modeling System.

EDIVIS is the FAA Emissions and Dispersion Modeling System.

Std. is the National Ambient Air Quality Standard (NAAQS) for the specified pollutant, except in the case of NO_2, which has no NAAQS for the one-hour averaging time.

For NO_2, the standard is a state policy level standard.

Aircraft Fleet Used for EDMS Modeling

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
**A310-300-S-A2	DEFAULT	S. Cargo	27	73
**A320-200-M15R	DEFAULT	Main	15R	291
**A320-200-M22R	DEFAULT	Main	22R	776
**A320-200-M27	DEFAULT	Main	27	1109
**A320-200-M33L	DEFAULT	Main	33L	495
**A320-200-M9	DEFAULT	Main	9	550
**A320-211-M14	DEFAULT	Main	14	245
**A320-211-M22R	DEFAULT	Main	22R	655
**A320-211-M33L	DEFAULT	Main	33L	417
**A320-211-M4R	DEFAULT	Main	4R	351
**A320-211-M9	DEFAULT	Main	9	464
**A321-M15R	DEFAULT	Main	15R	334
**A321-M22R	DEFAULT	Main	22R	869
**A321-M22R-A5	DEFAULT	Main	22R	608
**A321-M27	DEFAULT	Main	27	988
**A321-M27-A5	DEFAULT	Main	27	530
**A321-M33L	DEFAULT	Main	33L	806
**A321-M33L-A5	DEFAULT	Main	33L	493
**A321-M9	DEFAULT	Main	9	520
**A321-M9-A5	DEFAULT	Main	9	363
**A340-300-M27C2	DEFAULT	Main	27	196
**A340-300-M27C3	DEFAULT	Main	27	500
**AVRO-RJ70-M22R	DEFAULT	Main	22R	983
**AVRO-RJ70-M27	DEFAULT	Main	27	1358
**AVRO-RJ70-M33L	DEFAULT	Main	33L	326
**AVRO-RJ70-M9	DEFAULT	Main	9	781
**13727-100-S-7	DEFAULT	S. Cargo	22L	9
**B727-200F-MI5R-15	DEFAULT	Main	15R	425
**B727-200F-M22R-15	DEFAULT	Main	22R	778
**B727-200F-M22R-9	DEFAULT	Main	22R	212
**B727-200F-M27-9	DEFAULT	Main	27	359
**B727-200F-M33L-15	DEFAULT	Main	33L	709
**B727-200F-M9-15	DEFAULT	Main	9	829
**B727-200F-N4R-15	DEFAULT	N. Cargo	4R	550
**B727-200F-S33L-15	DEFAULT	S. Cargo	33L	19
**B727-200F-S33L-7	DEFAULT	S. Cargo	33L	517
**B727-200-M22R-15	DEFAULT	Main	22R	239
**B727-200-M22R-9A	DEFAULT	Main	22R	376
**B727-200-M27-9A	DEFAULT	Main	27	637
**B727-200-N-15	DEFAULT	N. Cargo	14	21
**B727-200-S-15	DEFAULT	S. Cargo	14	21
**B737-100-M22L-7B	DEFAULT	Main	22L	341
**B737-100-M22R-15A	DEFAULT	Main	22R	622

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
**B737-100-M22R-9A	DEFAULT	Main	22R	370
**B737-100-M27-15A	DEFAULT	Main	27	759
**B737-100-M33L-15A	DEFAULT	Main	33L	301
**B737-100-M9-15A	DEFAULT	Main	9	373
**13737-300-M14-3B	DEFAULT	Main	14	326
**B737-300-M15R-3B	DEFAULT	Main	15R	441
**B737-300-M22L-3B	DEFAULT	Main	22L	365
**13737-300-102211-313	DEFAULT	Main	22R	1680
**B737-300-M33L-3B	DEFAULT	Main	33L	1347
**B737-300-M4R-3B	DEFAULT	Main	4R	1108
**B737-300-M9-3B	DEFAULT	Main	9	1434
**B737-400-M15R-3C1	DEFAULT	Main	15R	471
**B737-400-M22R-3B	DEFAULT	Main	22R	637
**B737-400-M22R-3C1	DEFAULT	Main	22R	427
**B737-400-M27-3	DEFAULT	Main	27	413
**B737-400-M27-3B	DEFAULT	Main	27	772
**B737-400-M27-3C1	DEFAULT	Main	27	732
**B737-400-M33L-3B	DEFAULT	Main	33L	312
**B737-400-M9-3B	DEFAULT	Main	9	381
**B737-400-M9-3C1	DEFAULT	Main	9	361
**B737-500-MI5R-3	DEFAULT	Main	15R	282
**B737-500-M22R-3	DEFAULT	Main	22R	1181
**B737-500-M22R-3C1	DEFAULT	Main	22R	706
**B737-500-M27-3	DEFAULT	Main	27	2024
**B737-500-M27-3C1	DEFAULT	Main	27	1211
**B737-500-M33L-3	DEFAULT	Main	33L	486
**B737-500-M33L-3C1	DEFAULT	Main	33L	460
**B737-500-M9-3	DEFAULT	Main	9	970
**B737-500-M9-3C1	DEFAULT	Main	9	580
**B747-200-N33L-7F	DEFAULT	N. Cargo	33L	117
**B747-200-S22R-7F	DEFAULT	S. Cargo	22R	134
**B747-400-M22L-B1	DEFAULT	Main	22L	291
**B747-400-M33L-B1	DEFAULT	Main	33L	333
**B757-200-M15R-37	DEFAULT	Main	15R	506
**B757-200-M15R-E4	DEFAULT	Main	15R	686
**B757-200-M22L-37	DEFAULT	Main	22L	504
**B757-200-M22L-40	DEFAULT	Main	22L	394
**B757-200-M22L-E4	DEFAULT	Main	22L	683
**B757-200-M22R-37	DEFAULT	Main	22R	1085
**B757-200-M22R-40	DEFAULT	Main	22R	424
**B757-200-M22R-5C	DEFAULT	Main	22R	339
**B757-200-M22R-E4	DEFAULT	Main	22R	1473
**B757-200-M27-40	DEFAULT	Main	27	726

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
**B757-200-M27-5C	DEFAULT	Main	27	301
**B757-200-M27-E4	DEFAULT	Main	27	2525
**B757-200-M33L-37	DEFAULT	Main	33L	1422
**B757-200-M33L-40	DEFAULT	Main	33L	555
**B757-200-M33L-5C	DEFAULT	Main	33L	230
**B757-200-M4R-37	DEFAULT	Main	4R	958
**B757-200-M4R-E4	DEFAULT	Main	4R	1300
**B757-200-M9-37	DEFAULT	Main	9	1074
**B757-200-M9-40	DEFAULT	Main	9	419
**B757-200-M9-E4	DEFAULT	Main	9	1457
**B757-200-N27-37	DEFAULT	N. Cargo	27	452
**B757-200-S27-37	DEFAULT	S. Cargo	27	452
**B767-200-M22R-4D	DEFAULT	Main	22R	276
**B767-200-M22R-A2	DEFAULT	Main	22R	223
**B767-200-M27-A2	DEFAULT	Main	27	337
**B767-200-M4R-4D	DEFAULT	Main	4R	255
**B767-200-N15R-4D	DEFAULT	N. Cargo	15R	41
**B767-200-S15R-4D	DEFAULT	S. Cargo	15R	41
**B79-200-M9-15	DEFAULT	Main	9	273
**BAE146-200-M22R-5	DEFAULT	Main	22R	251
**BAE146-200-M9-5	DEFAULT	Main	9	297
"131-1-1900-M14	DEFAULT	Main	14	1295
**BH-1900-MI5R	DEFAULT	Main	15R	522
**BH-1900-M22R	DEFAULT	Main	22R	3747
**BH-1900-M27	DEFAULT	Main	27	6263
**BH-1900-M33L	DEFAULT	Main	33L	1683
**BH-1900-M9	DEFAULT	Main	9	1358
"*Can Reg-100-M15R	DEFAULT	Main	15R	173
**Can Reg-100-M22R	DEFAULT	Main	22R	720
**Can Reg-100-M33L	DEFAULT	Main	33L	297
**Can Reg-100-M4R	DEFAULT	Main	4R	351
**Can Reg-100-M9	DEFAULT	Main	9	710
**DASH-7-M14	DEFAULT	Main	14	384
**DASH-7-M22R	DEFAULT	Main	22R	542
**DASH-7-M33L	DEFAULT	Main	33L	1013
**DC10-10-M22L	DEFAULT	Main	22L	575
**DC10-10-M4R	DEFAULT	Main	4R	479
**DC10-10-S33L	DEFAULT	S. Cargo	33L	580
**DC10-30-S4R-C2	DEFAULT	S. Cargo	4R	46
**DC8-60-S27	DEFAULT	S. Cargo	27	240
**DC8-70-N22R	DEFAULT	N. Cargo	22R	389
**DC8-70-N9	DEFAULT	N. Cargo	9	458
**DC8-70-S22R	DEFAULT	S. Cargo	22R	233

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
**DC8-70-S27	DEFAULT	S. Cargo	27	399
**DC8-70-S9	DEFAULT	S. Cargo	9	275
**DC9-30-M22L-9A	DEFAULT	Main	22L	309
**DC9-30-M22R-7B	DEFAULT	Main	22R	553
**DC9-30-M4R-9A	DEFAULT	Main	413	444
**DC9-30-M9-7B	DEFAULT	Main	9	658
**DC9-30-N14-9	DEFAULT	N. Cargo	14	127
**DC9-30-S14-9	DEFAULT	S. Cargo	14	127
**DHC-8-300-M22R	DEFAULT	Main	22R	753
**DHC-8-300-M4L	DEFAULT	Main	4L	518
**DHC-8-300-M9	DEFAULT	Main	9	534
**DHC-8-M22R-OA	DEFAULT	Main	22R	831
**DHC-8M22R-21	DEFAULT	Main	22R	559
**DHC-8-M4L-OA	DEFAULT	Main	4L	571
**DHC-8-M4L-120	DEFAULT	Main	4L	240
**DHC-8-M4L-21	DEFAULT	Main	4L	272
**DHC-8-M9-OA	DEFAULT	Main	9	589
"EMB-120-M14	DEFAULT	Main	14	450
**EMB-120-M22R	DEFAULT	Main	22R	1484
**EMB-120-M33L	DEFAULT	Main	33L	584
**EMB-120-M4L	DEFAULT	Main	4L	1132
**EMB-1 20-M9	DEFAULT	Main	9	472
**F1 00-M22R-650	DEFAULT	Main	22R	398
**F1 00-M9-650	DEFAULT	Main	9	472
**Falcon 20-S22R	DEFAULT	S. Cargo	22R	536
**Falcon 20-S9	DEFAULT	S. Cargo	9	637
**HS7482A-M14	DEFAULT	Main	14	417
**HS7482A-M22R	DEFAULT	Main	22R	1197
**HS7482A-M4L	DEFAULT	Main	4L	822
**HS7482A-M9	DEFAULT	Main	9	430
**L-1011-500-S15R-B	DEFAULT	S. Cargo	15R	24
**L-1011-50-M22R	DEFAULT	Main	22R	206
**L-1011-50-M9	DEFAULT	Main	9	189
**Learjet 35-S15L	DEFAULT	S. Cargo	15L	175
**Learjet 35-S22L	DEFAULT	S. Cargo	22L	1012
**Learjet 35-S32	DEFAULT	S. Cargo	32	447
**Learjet 35-S4L	DEFAULT	S. Cargo	4L	480
**Learjet 35-S4R	DEFAULT	S. Cargo	4R	1004
**MD-11-M4R-60	DEFAULT	Main	4R	191
**MD-80-81-M14	DEFAULT	Main	14	990
**MD-80-81-MI5R	DEFAULT	Main	15R	2239
**MD-80-81-M22R	DEFAULT	Main	22R	6202
**MD-80-81-M33L	DEFAULT	Main	33L	2545

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
**MD-80-81-M4R	DEFAULT	Main	4R	3513
**MD-80-81-M9	DEFAULT	Main	9	4960
**MD-90-10-22R	DEFAULT	Main	22R	1065
**MD-90-10-33L	DEFAULT	Main	33L	519
**MD-90-10-MI5R	DEFAULT	Main	15R	304
**MD-90-10-M4R	DEFAULT	Main	4R	555
**MD-90-10-M9	DEFAULT	Main	9	1063
**P-337P-S14	DEFAULT	S. Cargo	14	412
**P-337P-S22R	DEFAULT	S. Cargo	22R	1358
**P-337P-S33L	DEFAULT	S. Cargo	33L	535
**P-337P-S4L	DEFAULT	S. Cargo	4L	1037
**P-337P-S9	DEFAULT	S. Cargo	9	432
**SF-340-B-M14	DEFAULT	Main	14	3073
**SF-340-B-M15R	DEFAULT	Main	15R	830
**SF-340-B-M22L	DEFAULT	Main	22L	366
**SF-340-B-M22R	DEFAULT	Main	22R	7768
**SF-340-B-M4L	DEFAULT	Main	4L	6054
**SF-340-B-M9	DEFAULT	Main	9	3166
**Sw Merl-M14	DEFAULT	Main	14	383
**Sw Merl-M22R	DEFAULT	Main	22R	1262
**Sw Merl-M33L	DEFAULT	Main	33L	498
**Sw Merl-M4L	DEFAULT	Main	4L	963
**Sw Merl-M9	DEFAULT	Main	9	402
**Sw Met-M14	DEFAULT	Main	14	968
**Sw Met-M15R	DEFAULT	Main	15R	398
**Sw Met-M22L	DEFAULT	Main	22L	802
**Sw Met-M22R	DEFAULT	Main	22R	2493
**Sw Met-M33L	DEFAULT	Main	33L	1284
**Sw Met-M4L	DEFAULT	Main	4L	2405
**Sw Met-M4R	DEFAULT	Main	4R	179
**Sw Met-M9	DEFAULT	Main	9	958
A300-600	PW4158	S. Cargo	27	60
A300-132-200	CF6-50C2R	Main	27	338
A300-134-200	DEFAULT	Main	27	466
A300-134-605R	CF6-80C2A5	Main	27	305
A310-200	JT9D-7R4D1	Main	22R	8
A310-200	CF6-80A3	Main	22R	54
A310-200	CF6-80C2A2	Main	27	23
A310-300	CF6-80C2A2	Main	27	81
A310-300	JT9D-7R4EI	Main	22R	31
A310-300	PW4152	Main	22R	74
A310-300	PW4156 (Old Comb)	Main	4R	12
A320	CFM56-5134	Main	9	16

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
A320-200	CFM56-5A3	Main	27	325
A320-200	V2500-A1	Main	27	390
A320-200	V2527-A5	Main	4R	416
A320-211	CFM56-5A1	Main	27	936
A321	CFM56-5131	Main	4R	531
A321	V2530-A5	Main	4R	312
A330	CF6-80E1A1	Main	33L	243
A330	PW4164	Main	33L	194
A330	PW4168	Main	33L	259
A330	TRENT-768	Main	33L	324
A330	TRENT-772	Main	33L	113
A340-300	CFM56-5C2	Main	9	250
A340-300	CFM56-5C3	Main	22R	201
AVRO-RJ70	LF507 SERIES	Main	4R	386
B727-1 00	JT8D-7	N. Cargo	22L	9
B727-1 00	JT8D-7B	Main	22L	52
B727-200	JT8D-15	Main	27	404
B727-200	JT8D-17	Main	14	16
B727-200	JT8D-9	Main	27	161
B727-200	JT8D-15A	Main	4R	77
B727-200	JT8D-17A	Main	4R	32
B727-200	JT8D-17R	Main	15R	77
B727-200	JT8D-9A	Main	9	430
B727-200F	JT8D-15	Main	27	1333
B727-200F	JT8D-15A	Main	27	391
B727-200F	JT8D-17	Main	33L	81
B727-200F	JT8D-17A	Main	14	163
B727-200F	JT8D-17R	Main	27	391
B727-200F	JT8D-7B	Main	14	261
B727-200F	JT8D-9	Main	9	243
B727-200F	DEFAULT	N. Cargo	411	114
B737-100	JT8D-15A	Main	4R	350
B737-100	JT8D-17	Main	15R	150
B737-100	JT8D-17A	Main	15R	125
B737-100	JT8D-7A	Main	4R	168
B737-100	JT8D-7B	Main	4R	252
B737-100	JT8D-9A	Main	411	470
B737-200	JT8D-15A	Main	15R	87
B737-300	CFM56-313	Main	27	2880
B737-300	CFM56-3C-1	Main	27	412
B737-400	CFM56-3C-1	Main	413	340
B737-400	CFM56-3	Main	9	524
B737-400	CFM56-3B	Main	413	359

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
B737-500	CFM56-313	Main	4R	770
B737-500	CFM56-3C-1	Main	4R	460
B747-100F	JT9D-70A	N. Cargo	33L	4
B747-200	JT9D-7A	Main	22L	70
B747-200	JT9D-7Q	Main	15R	17
B747-200	CF6-50E2	Main	22L	44
B747-200	JT9D-7F	Main	22L	26
B747-200	JT9D-7J	Main	15R	9
B747-200	JT9D-7R4G2	Main	22L	4
B747-200	RB211-524D4	Main	15R	16
B747-400	PW4056	Main	33L	434
B747-400	RB211-524G	Main	33L	349
B747-400	RB211-524H	Main	15R	28
B757-200	PW2037	Main	27	1859
B757-200	RB211-535E4	Main	33L	1929
B757-200	PW2040	Main	4R	374
B757-200	RB211-535C	Main	9	329
B767-200	JT9D-7R4D	Main	27	420
B767-200	CF6-80A2	Main	9	205
B767-200	CF6-80C2B2	Main	15R	308
B767-300	PW4060	Main	4R	322
B767-300	CF6-80A2	Main	413	114
B767-300	CF6-80C2B6	Main	27	663
B767-300	PW4056	Main	15R	104
B767-300	RB211-524H	Main	15R	147
B777-200	GE90-85B	Main	15R	178
B777-200	PW4084	Main	22L	302
B777-200	TRENT-875	Main	22L	73
B777-200	TRENT-877	Main	22L	7
B777-200	TRENT-890	Main	22L	25
B777-200	GE90-76B	Main	15R	7
BAD 46-200	ALF50211-5	Main	27	429
BAE146-200	ALF50211-3	Main	14	127
BH-1900	PT6A-65B	Main	4L	3258
BH-C99	PT6A-27	Main	27	377
Canadair Reg-100	CF34-3A1	Main	27	1235
DASH-7	PT6A-50	Main	4L	373
DC10-10	CF6-6D	Main	33L	852
DC10-30	CF6-50C2	Main	33L	241
DC10-30	CF6-50C	Main	22L	169
DC10-40	JT9D-20	Main	33L	507
DC8-60	JT3D-7 SERIES	N. Cargo	27	293
DC8-70	CFM56-2C5	N. Cargo	27	665

Aircraft Fleet Used for EDMS Modeling (Cont'd.)

Aircraft	Engine	Terminal/Gate Area	Runway	Annual LTOs
DC9-10	JT8D-7A	Main	14	17
DC9-10	JT8D-7B	Main	14	191
DC9-30	JT8D-9	Main	14	121
DC9-30	JT8D-11	Main	14	114
DC9-30	JT8D-15	Main	14	153
DC9-30	JT8D-17	Main	14	448
DC9-30	JT8D-7A	Main	14	188
DC9-30	JT8D-7B	Main	27	949
DC9-30	JT8D-9A	Main	15R	705
DC9-40	JT8D-11	Main	14	19
DC9-50	JT8D-17	Main	14	118
DC9-50	JTBD-15	Main	14	40
DHC-8	PW120A	Main	33L	1554
DHC-8	PW120	Main	33L	491
DHC-8-100	PW121	Main	22R	694
DHC-8-300	PW123	Main	33L	1407
DHC-8-400	PW123	Main	33L	511
EMB-120	PW118	Main	27	2176
F-28-1000	RR SPEY-MK555	Main	14	212
F-70-100	TAY620-15	Main	14	154
Falcon 20	CF700-2D	S. Cargo	27	919
FOKKER 100	TAY620-15	Main	14	120
FOKKER 100-100	TAY650-15	Main	27	682
HS 748 2A SERIES	RDa7	Main	33L	2236
L-1011-50	RB211-22B	Main	27	312
L-1011-500	R13211-524134	Main	413	338
P011-500 TR	RB211-524B4	N. Cargo	15R	24
Learjet 35/36	TFE 731-2-213	S. Cargo	22R	1647
MD-11	CF6-80C2D1 F	Main	22L	203
MD-11	PW4460	Main	33L	217
MD-80-81	JT81D-219	Main	27	8759
MD-90-10	V2525-D5	Main	27	1826
P-337P Skymaster	TSIO-3600	S. Cargo	27	1992
SF-340-B-PLUS	CT7-5	Main	33L	16317
Swearingen Merlin	TPE331-3	Main	27	1852
Swearingen Metro 2	TPE331-3	Main	27	4338
Total LTO Cycles				**254913**

** Indicates this is a user-created aircraft entered for the purpose of accurate runway assignments.

2015 RJ Fleet – Emission Inventory Results

ESTIMATED CO EMISSIONS AT LOGAN AIRPORT
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	5,137	2,067
Service Vehicles	6,670	2,684
Airport-Related Motor Vehicles		
Parking/Curbside	469	189
On-airport vehicles	932	375
Total motor vehicle sources	1,401	564
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	45	18
Total other sources	45	18
TOTAL AIRPORT SOURCES	**13,253**	**5,332**

ESTIMATED NO_x EMISSIONS AT LOGAN AIRPORT
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	5,271	2,121
Service Vehicles	693	279
Airport-Related Motor Vehicles		
Parking/Curbside	19	8
On-airport vehicles	187	75
Total motor vehicle sources	206	83
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	533	214
Total other sources	533	214
TOTAL AIRPORT SOURCES	**6,703**	**2,697**

ESTIMATED VOC EMISSIONS AT LOGAN AIRPORT
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	657	264
Service Vehicles	581	234
Airport-Related Motor Vehicles		
Parking/Curbside	35	14
On-airport vehicles	120	48
Total motor vehicle sources	155	62
Other Sources		
Fuel storage/handling	748	301
Miscellaneous sources**	6	2
Total other sources	754	303
TOTAL AIRPORT SOURCES	**2,147**	**864**

ESTIMATED PM10 EMISSIONS AT LOGAN AIRPORT
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	203	82
Service Vehicles	11	4
Airport-Related Motor Vehicles		
Parking/Curbside	0	0
On-airport vehicles	9	4
Total motor vehicle sources	9	4
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	16	6
Total other sources	16	6
TOTAL AIRPORT SOURCES	**239**	**96**

ESTIMATED CO EMISSIONS AT LOGAN AIRPORT
ALTERNATIVE 1
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	4,206	1,692
Service Vehicles	6,670	2,684
Airport-Related Motor Vehicles		
Parking/Curbside	469	189
On-airport vehicles	932	375
Total motor vehicle sources	1,401	564
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	45	18
Total other sources	45	18
TOTAL AIRPORT SOURCES	**12,322**	**4,958**

ESTIMATED NO_x EMISSIONS AT LOGAN AIRPORT
ALTERNATIVE 1
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	5,099	2,052
Service Vehicles	693	279
Airport-Related Motor Vehicles		
Parking/Curbside	19	8
On-airport vehicles	187	75
Total motor vehicle sources	206	83
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	533	214
Total other sources	533	214
TOTAL AIRPORT SOURCES	**6,531**	**2,628**

ESTIMATED VOC EMISSIONS AT LOGAN AIRPORT
ALTERNATIVE 1
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	529	213
Service Vehicles	581	234
Airport-Related Motor Vehicles		
Parking/Curbside	35	14
On-airport vehicles	120	48
Total motor vehicle sources	155	62
Other Sources		
Fuel storage/handling	748	301
Miscellaneous sources**	6	2
Total other sources	754	303
TOTAL AIRPORT SOURCES	**2,019**	**812**

ESTIMATED PM10 EMISSIONS AT LOGAN AIRPORT
ALTERNATIVE 1
2015 HIGH RJ FLEET

SOURCE CATEGORIES	KG/DAY	TONS/YEAR
Aircraft Sources*	178	72
Service Vehicles	11	4
Airport-Related Motor Vehicles		
Parking/Curbside	0	0
On-airport vehicles	9	4
Total motor vehicle sources	9	4
Other Sources		
Fuel storage/handling	0	0
Miscellaneous sources**	16	6
Total other sources	16	6
TOTAL AIRPORT SOURCES	**214**	**86**

2015 RJ Fleet –Dispersion Modeling Results

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
CO, SECOND HIGHEST ONE-HOUR LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	6,125
2. East Boston (Constitution Beach)	4,294
3. East Boston (Bayswater)	4,245
4. Winthrop (Court/Loring St.)	4,174
5. Winthrop (Cottage Park)	3,884
6. Winthrop (Grandview)	3,801
7. Castle Island	4,260
8. C & Broadway	3,856
9. South End (Union Park)	4,067
10. Eagle Hill	4,594
11. Orient Heights	4,069
12. Revere Beach	3,886

All concentrations include a background level of 3,420 $\mu g/m^3$

Ambient air quality standard = 40,000 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
CO, SECOND HIGHEST EIGHT-HOUR LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	2,922
2. East Boston (Constitution Beach)	2,307
3. East Boston (Bayswater)	2,308
4. Winthrop (Court/Loring St.)	2,300
5. Winthrop (Cottage Park)	2,133
6. Winthrop (Grandview)	2,161
7. Castle Island	2,236
8. C & Broadway	2,121
9. South End (Union Park)	2,186
10. Eagle Hill	2,319
11. Orient Heights	2,219
12. Revere Beach	2,148

All concentrations include a background level of 2,052 $\mu g/m^3$

Ambient air quality standard = 10,000 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
NO_2, SECOND HIGHEST ONE-HOUR LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	279
2. East Boston (Constitution Beach)	243
3. East Boston (Bayswater)	252
4. Winthrop (Court/Loring St.)	221
5. Winthrop (Cottage Park)	201
6. Winthrop (Grandview)	197
7. Castle Island	242
8. C & Broadway	202
9. South End (Union Park)	202
10. Eagle Hill	229
11. Orient Heights	225
12. Revere Beach	204

All concentrations include a background level of 163 $\mu g/m^3$
Ambient air quality standard = 320 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
NO_2, HIGHEST ANNUAL LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	56
2. East Boston (Constitution Beach)	55
3. East Boston (Bayswater)	55
4. Winthrop (Court/Loring St.)	55
5. Winthrop (Cottage Park)	54
6. Winthrop (Grandview)	54
7. Castle Island	54
8. C & Broadway	53
9. South End (Union Park)	53
10. Eagle Hill	54
11. Orient Heights	54
12. Revere Beach	53

All concentrations include a background level of 53 $\mu g/m^3$
Ambient air quality standard = 100 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
PM_{10}, SECOND HIGHEST 24-HOUR LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	48
2. East Boston (Constitution Beach)	47
3. East Boston (Bayswater)	47
4. Winthrop (Court/Loring St.)	47
5. Winthrop (Cottage Park)	46
6. Winthrop (Grandview)	46
7. Castle Island	46
8. C & Broadway	45
9. South End (Union Park)	46
10. Eagle Hill	46
11. Orient Heights	46
12. Revere Beach	46

All concentrations include a background level of 45 $\mu g/m^3$
Ambient air quality standard = 150 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
PM_{10}, HIGHEST ANNUAL LEVELS
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	24
2. East Boston (Constitution Beach)	23
3. East Boston (Bayswater)	23
4. Winthrop (Court/Loring St.)	23
5. Winthrop (Cottage Park)	23
6. Winthrop (Grandview)	23
7. Castle Island	23
8. C & Broadway	23
9. South End (Union Park)	23
10. Eagle Hill	23
11. Orient Heights	23
12. Revere Beach	23

All concentrations include a background level of 23 $\mu g/m^3$
Ambient air quality standard = 50 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
VOC, HIGHEST 24-HOUR LEVELS (OZONE INDICATOR)
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	49
2. East Boston (Constitution Beach)	35
3. East Boston (Bayswater)	16
4. Winthrop (Court/Loring St.)	16
5. Winthrop (Cottage Park)	9
6. Winthrop (Grandview)	9
7. Castle Island	12
8. C & Broadway	4
9. South End (Union Park)	5
10. Eagle Hill	28
11. Orient Heights	14
12. Revere Beach	9

No background levels are included
There is no applicable air quality standard

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
VOC, HIGHEST ONE-HOUR LEVELS (ODOR INDICATOR)
NO ACTION ALTERNATIVE
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	250
2. East Boston (Constitution Beach)	212
3. East Boston (Bayswater)	70
4. Winthrop (Court/Loring St.)	62
5. Winthrop (Cottage Park)	52
6. Winthrop (Grandview)	39
7. Castle Island	76
8. C & Broadway	26
9. South End (Union Park)	42
10. Eagle Hill	324
11. Orient Heights	140
12. Revere Beach	33

No background levels are included
There is no applicable air quality standard

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
CO, SECOND HIGHEST ONE-HOUR LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	6,104
2. East Boston (Constitution Beach)	4,275
3. East Boston (Bayswater)	4,082
4. Winthrop (Court/Loring St.)	4,126
5. Winthrop (Cottage Park)	3,802
6. Winthrop (Grandview)	3,749
7. Castle Island	4,131
8. C & Broadway	3,806
9. South End (Union Park)	4,022
10. Eagle Hill	4,461
11. Orient Heights	4,044
12. Revere Beach	3,814

All concentrations include a background level of 3,420 $\mu g/m^3$

Ambient air quality standard = 40,000 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
CO, SECOND HIGHEST EIGHT-HOUR LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	2,884
2. East Boston (Constitution Beach)	2,298
3. East Boston (Bayswater)	2,234
4. Winthrop (Court/Loring St.)	2,266
5. Winthrop (Cottage Park)	2,135
6. Winthrop (Grandview)	2,155
7. Castle Island	2,221
8. C & Broadway	2,113
9. South End (Union Park)	2,164
10. Eagle Hill	2,308
11. Orient Heights	2,204
12. Revere Beach	2,135

All concentrations include a background level of 2,052 $\mu g/m^3$

Ambient air quality standard = 10,000 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
NO_2, SECOND HIGHEST ONE-HOUR LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	290
2. East Boston (Constitution Beach)	226
3. East Boston (Bayswater)	210
4. Winthrop (Court/Loring St.)	200
5. Winthrop (Cottage Park)	202
6. Winthrop (Grandview)	209
7. Castle Island	214
8. C & Broadway	204
9. South End (Union Park)	191
10. Eagle Hill	221
11. Orient Heights	205
12. Revere Beach	187

All concentrations include a background level of 163 $\mu g/m^3$

Ambient air quality standard = 320 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
NO_2, HIGHEST ANNUAL LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	55
2. East Boston (Constitution Beach)	54
3. East Boston (Bayswater)	54
4. Winthrop (Court/Loring St.)	54
5. Winthrop (Cottage Park)	54
6. Winthrop (Grandview)	54
7. Castle Island	53
8. C & Broadway	53
9. South End (Union Park)	53
10. Eagle Hill	54
11. Orient Heights	54
12. Revere Beach	53

All concentrations include a background level of 53 $\mu g/m^3$

Ambient air quality standard = 100 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
PM_{10}, SECOND HIGHEST 24-HOUR LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	48
2. East Boston (Constitution Beach)	46
3. East Boston (Bayswater)	46
4. Winthrop (Court/Loring St.)	46
5. Winthrop (Cottage Park)	46
6. Winthrop (Grandview)	46
7. Castle Island	46
8. C & Broadway	45
9. South End (Union Park)	45
10. Eagle Hill	46
11. Orient Heights	46
12. Revere Beach	45

All concentrations include a background level of 45 $\mu g/m^3$
Ambient air quality standard = 150 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
PM_{10}, HIGHEST ANNUAL LEVELS
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	24
2. East Boston (Constitution Beach)	23
3. East Boston (Bayswater)	23
4. Winthrop (Court/Loring St.)	23
5. Winthrop (Cottage Park)	23
6. Winthrop (Grandview)	23
7. Castle Island	23
8. C & Broadway	23
9. South End (Union Park)	23
10. Eagle Hill	23
11. Orient Heights	23
12. Revere Beach	23

All concentrations include a background level of 23 $\mu g/m^3$
Ambient air quality standard = 50 $\mu g/m^3$

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
VOC, HIGHEST 24-HOUR LEVELS (OZONE INDICATOR)
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	46
2. East Boston (Constitution Beach)	35
3. East Boston (Bayswater)	11
4. Winthrop (Court/Loring St.)	14
5. Winthrop (Cottage Park)	8
6. Winthrop (Grandview)	9
7. Castle Island	11
8. C & Broadway	4
9. South End (Union Park)	4
10. Eagle Hill	27
11. Orient Heights	13
12. Revere Beach	8

No background levels are included
There is no applicable air quality standard

AIR QUALITY DISPERSION MODEL RESULTS FOR LOGAN AIRPORT
VOC, HIGHEST ONE-HOUR LEVELS (ODOR INDICATOR)
ALTERNATIVE 1
2015 HIGH RJ FLEET

RECEPTOR LOCATION	CONCENTRATION ($\mu g/m^3$)
1. East Boston (Jeffries Point)	250
2. East Boston (Constitution Beach)	212
3. East Boston (Bayswater)	69
4. Winthrop (Court/Loring St.)	60
5. Winthrop (Cottage Park)	52
6. Winthrop (Grandview)	39
7. Castle Island	50
8. C & Broadway	26
9. South End (Union Park)	42
10. Eagle Hill	324
11. Orient Heights	140
12. Revere Beach	33

No background levels are included
There is no applicable air quality standard

Comparison of Air Quality Results for Alternatives
Excerpted from Draft EIS/EIR

Excerpt from the Airside Draft EIS/EIR
Air Quality Results

Table 6.3-1
Air Emissions Inventories Data Sources

Aircraft		Ground Service Equipment		Motor Vehicles		Miscellaneous	
Source	**Parameter**	**Source**	**Parameter**	**Source**	**Parameter**	**Source**	**Parameter**
Airside EIS/EIR	Fleet Mix Operations, by hour and aircraft type Runway Use Terminal Assignments In-flight Times-in-Mode[1] Runway End of Taxiway Queue Delay[1] Ground-based Times-in-mode	Massport	Equipment Type Service Times Fuel Type Load Factors Conversion Rates Emission Rates	GEIR	On-Airport ■ Traffic ■ Parking Curbside ■ Fleet mix East Boston ■ Airport Traffic ■ Non-airport traffic Region ■ Airport Traffic ■ Non-airport traffic	Massport	Heating Plant Factors Fuel Storage Facility Factors Fuel Distribution System Factors
FAA	Engine types, by aircraft Engine emission rates			MA DEP	Mobile 5b Input Factors Off-airport fleet mix Part 5 Emission Factors		
				EPA	Mobile 5b Emission Factors Part 5 Emission Factors		

(1) These data used for the 1997 Annual Update were obtained from the 1993 Final GEIR.

Table 6.3-2
Dispersion Modeling Averaging Times and Background Levels

Pollutant	Averaging Time	Standards (•g/m3)	Background Concentration (•g/m3)
CO	1-Hour	40,000	4,446
	8-Hour	10,000	2,502-2,262
HC	1-Hour (odor indicators)	N/A	N/A
	24-Hour (ozone indicators)	N/A	N/A
NO_2	1-Hour	320	163-173
	Annual	100	53-58
PM_{10}	24-Hour	150	45-48
	Annual	50	23

N/A not applicable

Table 6.3-3
Receptor Location for Dispersion Modeling

Receptor No.	Community	Location
1	East Boston	Jeffries Point Park tennis court, east end of Sumner Street
2	East Boston	Constitution Beach Bath House, east end of Coleridge Street
3	East Boston	Intersection of Annavoy and Bayswater Streets
4	Winthrop	Intersection of Court and Loring Roads
5	Winthrop	Cottage Park Yacht Club, south end of Orlando Avenue
6	Winthrop	Point Shirley intersection of Grandview and Bayview Avenues
7	Castle Island	Intersection of Farragut Road and First Street
8	South Boston	Intersection of Broadway and C Street
9	Southeast End	Union Park Street between Tremont Street and Shawmut Avenue
10	Eagle Hill	Intersection of Condor and Glendon Streets
11	Orient Heights	Intersection of Tower Drum Lane and Gladstone Street
12	Revere Beach	Public beach on Broad Sound

Table 6.3-4
CO Emissions Inventory - All Sources (kg/day)[(1)]

Alternative	1999 29M Low	1999 29M High	2010 37.5M Low	2010 37.5M High	2010 45M High
Alternative 1 - All Actions	13,022	13,701	13,289	13,976	15,816
Alternative 2 - All Actions except Runway 14/32	13,262	13,835	13,576	14,183	16,135
Alternative 3 - No-Build	13,859	13,956	14,308	14,611	16,890
Alternative 4 - No Action	13,905	14,159	14,355	15,236	17,123
1997 Annual Update	14,470		16,686		

(1) Includes aircraft sources, ground service equipment, on-site motor vehicles, and other miscellaneous sources. (See Appendix M for individual sources.)

Table 6.3-5
NOx Emissions Inventory - All Sources

Alternative	1999 29M Low	1999 29M High	2010 37.5M Low	2010 37.5M High	2010 45M High
Alternative 1 - All Actions	5,362	5,249	6,919	6,997	8,116
Alternative 2 - All Actions except Runway 14/32	5,391	5,267	6,961	7,027	8,164
Alternative 3 - No-Build	5,484	5,284	7,071	7,092	8,280
Alternative 4 - No Action	5,491	5,310	7,081	7,183	8,317
1997 Annual Update	6,670		8,343		

(1) Includes aircraft sources, ground service equipment, on-site motor vehicles, and other miscellaneous sources. (See Appendix M for individual sources.)

Table 6.3-6
Total VOC Emissions Inventory - All Sources (kg/day)

Alternative	1999 29M Low	1999 29M High	2010 37.5M Low	2010 37.5M High	2010 45M High
Alternative 1 - All Actions	2,350	2,568	2,383	2,497	2,897
Alternative 2 - All Actions except Runway 14/32	2,418	2,599	2,440	2,535	2,955
Alternative 3 - No-Build	2,543	2,625	2,564	2,607	3,092
Alternative 4 - No Action	2,553	2,677	2,572	2,721	3,131
1997 Annual Update	3,269		3,207		

(1) Includes aircraft sources, ground service equipment, on-site motor vehicles, and other miscellaneous sources. (See Appendix M for individual sources.)

Table 6.3-7
Odor-causing Hydrocarbon Emissions Inventory - All Sources[1,2] (kg/day)

	1999		2010		
Alternative	29M Low	29M High	37.5M Low	37.5M High	45M High
Alternative 1 - All Actions	909	1,060	802	870	901
Alternative 2 - All Actions except Runway 14/32	977	1,091	859	908	959
Alternative 3 - No-Build	1,102	1,117	983	980	1,096
Alternative 4 - No Action	1,112	1,169	991	1,094	1,135

1 Includes aircraft sources, ground service equipment, on-site motor vehicles, and other miscellaneous sources. (See Appendix M for individual sources.)

2 Odor-causing VOCs are not included in the GEIR.

Table 6.3-8
PM_{10} Emissions Inventory - All Sources [1,2,3] (kg/day)

	1999		2010		
Alternative	29M Low	29M High	37.5M Low	37.5M High	45M High
Alternative 1 - All Actions	217	231	251	268	299
Alternative 2 - All Actions except Runway 14/32	222	234	259	274	308
Alternative 3 - No-Build	237	236	279	285	330
Alternative 4 - No Action	238	242	280	301	336

1. Includes aircraft sources, ground service equipment, on-site motor vehicles, and other miscellaneous sources. (See TablesEI1-4, EI2-4, EI3-4 and EI4-4 in Appendix M for individual sources).
2. PM emissions are not included in the GEIR.
3. Assumes all PM emissions are PM_{10}.

Table 6.3-9
Off-Site Motor Vehicle Emissions[1] (kg/day)

Pollutant	1999	2010 37.5M	2010 45M
Carbon Monoxide	2,883	2,506	2,763
Nitrogen Oxides	1,027	948	1,048
Hydrocarbons (VOCs)	526	401	443
Particulate Matter	60	41	46

1 Includes airport-related motor vehicles in the East Boston and Regional Study Areas.

Table 6.3-10
1999 29M Low Dispersion Model Results Summary

Pollutant/Parameter	Community Air Concentration ($\mu g/m^3$)				Air Quality Standard ($\mu g/m^3$)
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
CO, 1-hour, highest 2nd high	5,676	5,741	5,771	6,002	40,000
CO, 8-hour, highest 2nd high	2,734	2,739	2,768	2,808	10,000
NO_2, 1-hour, highest 2nd high	255	252	254	263	320
NO_2, annual highest	55	55	55	55	100
PM_{10}, 24-hour, highest 2nd high	48	48	48	48	150
PM_{10}, annual highest	24	24	24	24	50
Ozone indicator, Total VOC, 24-hour, spatially-averaged highs	16	17	18	18	N/A
Odor indicator, Aircraft idle Mode VOC, 1-hour, spatially-averaged highs	90	96	93	96	N/A

N/A denotes "not applicable".

Table 6.3-11
1999 29m High Dispersion Model Results Summary

Pollutant/Parameter	Community Air Concentration ($\mu g/m^3$)				Air Quality Standard ($\mu g/m^3$)
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
CO, 1-hour, highest 2nd high	5,742	5,813	5,819	6,042	40,000
CO, 8-hour, highest 2nd high	2,759	2,761	2,776	2,836	10,000
NO_2, 1-hour, highest 2nd high	250	251	251	261	320
NO_2, annual highest	55	55	55	55	100
PM_{10}, 24-hour, highest 2nd high	48	48	48	48	150
PM_{10}, annual highest	24	24	24	24	50
Ozone indicator, Total VOC, 24-hour, spatially-averaged highs	17	18	18	17	N/A
Odor indicator, Aircraft idle Mode VOC, 1-hour, spatially-averaged highs	90	95	94	90	N/A

N/A denotes "not applicable".

Table 6.3-12
2010 37.5m Low Dispersion Model Results Summary

Pollutant/Parameter	Community Air Concentration ($\mu g/m^3$)				Air Quality Standard ($\mu g/m^3$)
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
CO, 1-hour, highest 2nd high	5,858	5,866	5,890	5,948	40,000
CO, 8-hour, highest 2nd high	2,805	2,803	2,837	2,862	10,000
NO_2, 1-hour, highest 2nd high	288	276	277	280	320
NO_2, annual highest	56	56	56	56	100
PM_{10}, 24-hour, highest 2nd high	48	48	49	49	150
PM_{10}, annual highest	24	24	24	24	50
Ozone indicator, Total VOC, 24-hour, spatially-averaged highs	18	19	19	20	N/A
Odor indicator, Aircraft idle Mode VOC, 1-hour, spatially-averaged highs	115	114	114	116	N/A

N/A denotes "not applicable".

Table 6.3-13
2010 37.5m High Dispersion Model Results Summary

Pollutant/Parameter	Community Air Concentration (µg/m³)				Air Quality Standard (µg/m³)
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
CO, 1-hour, highest 2nd high	5,743	5,759	5,768	5,798	40,000
CO, 8-hour, highest 2nd high	2,792	2,792	2,820	2,844	10,000
NO_2, 1-hour, highest 2nd high	282	271	271	275	320
NO_2, annual highest	56	56	56	56	100
PM_{10}, 24-hour, highest 2nd high	48	48	48	49	150
PM_{10}, annual highest	24	24	24	24	50
Ozone indicator, Total VOC, 24-hour, spatially-averaged highs	18	19	20	20	N/A
Odor indicator, Aircraft idle Mode VOHC, 1-hour, spatially-averaged highs	115	115	115	119	N/A

N/A denotes "not applicable".

Table 6.3-14
2010 45M High Dispersion Model Results Summary

Pollutant/Parameter	Community Air Concentration (μg/m³)				Air Quality Standard (μg/m³)
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
CO, 1-hour, highest 2nd high	6,064	6,058	6,083	6,120	40,000
CO, 8-hour, highest 2nd high	2,899	2,894	2,910	2,952	10,000
NO_2, 1-hour, highest 2nd high	299	282	283	289	320
NO_2, annual highest	56	56	56	56	100
PM_{10}, 24-hour, highest 2nd high	49	49	49	49	150
PM_{10}, annual highest	24	24	24	24	50
Ozone indicator, Total VOC, 24-hour, spatially averaged highs	22	23	23	24	N/A
Odor indicator, Aircraft idle Mode VOC, 1-hour, spatially averaged highs	144	148	151	151	N/A

N/A denotes "not applicable."

FIGURE 6.3-2 CO EMISSIONS INVENTORY - ALL SOURCES
(kg/day)

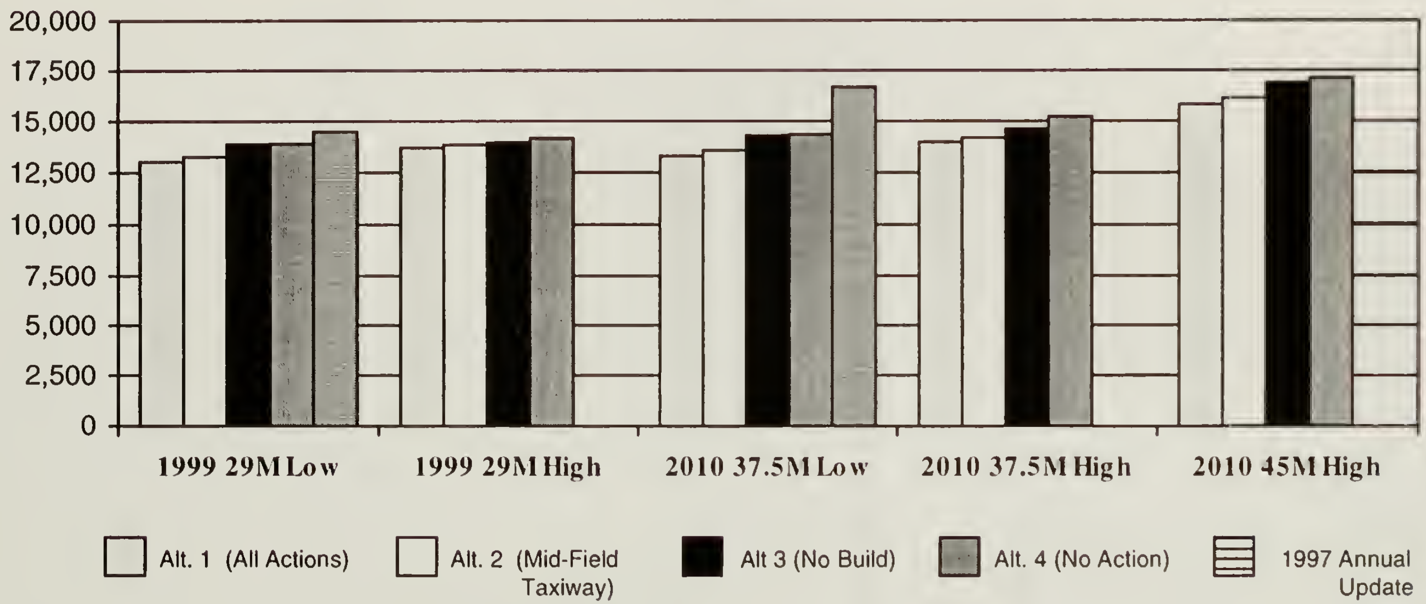


FIGURE 6.3-3 NOx EMISSIONS INVENTORY - ALL SOURCES
(kg/day)

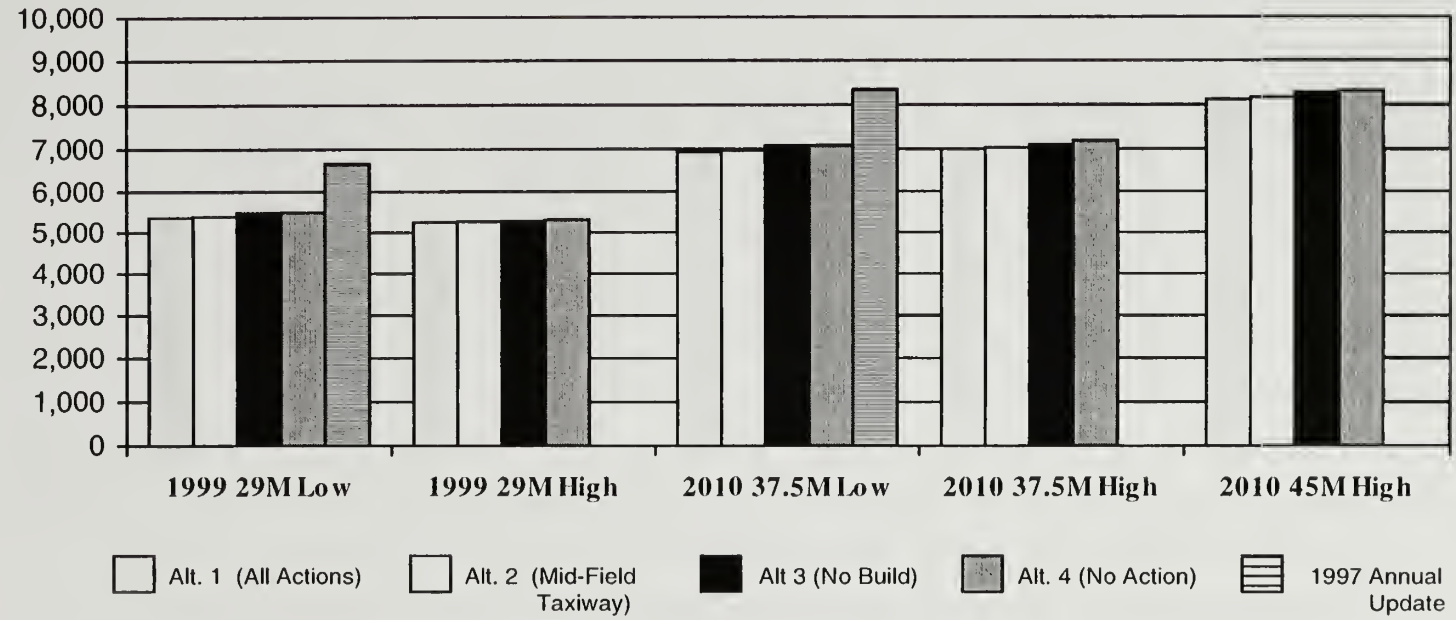


FIGURE 6.3-4 TOTAL VOCs EMISSIONS INVENTORY - ALL SOURCES
(kg/day)

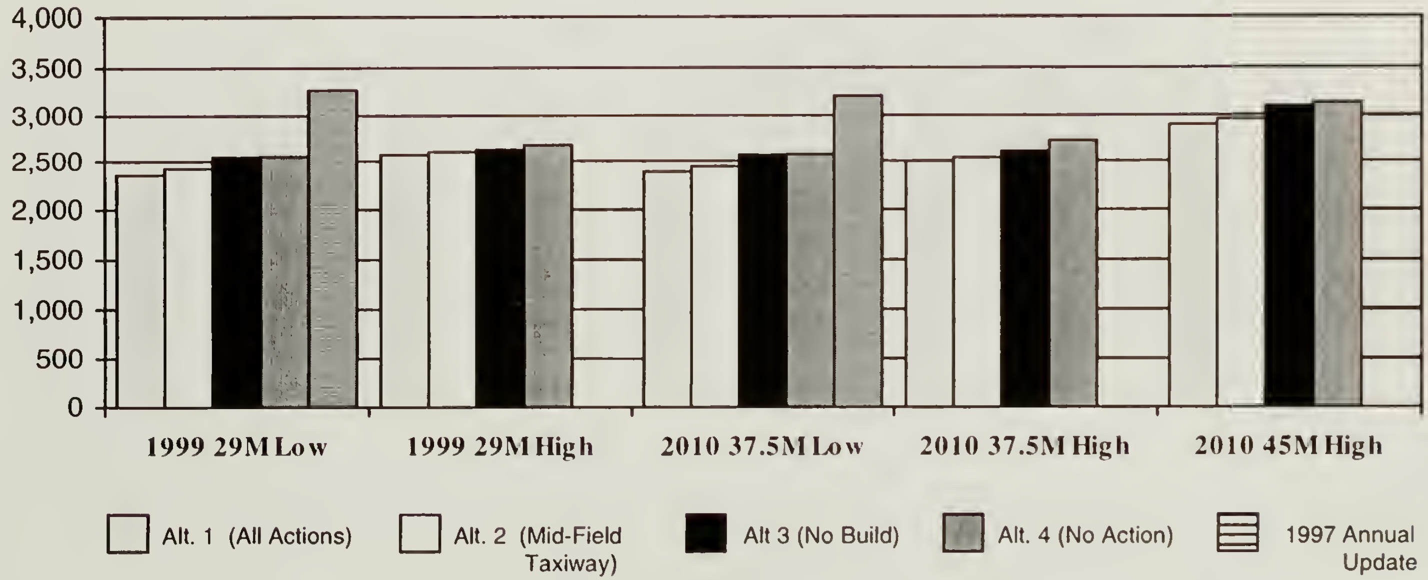


FIGURE 6.3-5 ODOR EMISSIONS INVENTORY - ALL SOURCES
(kg/day)

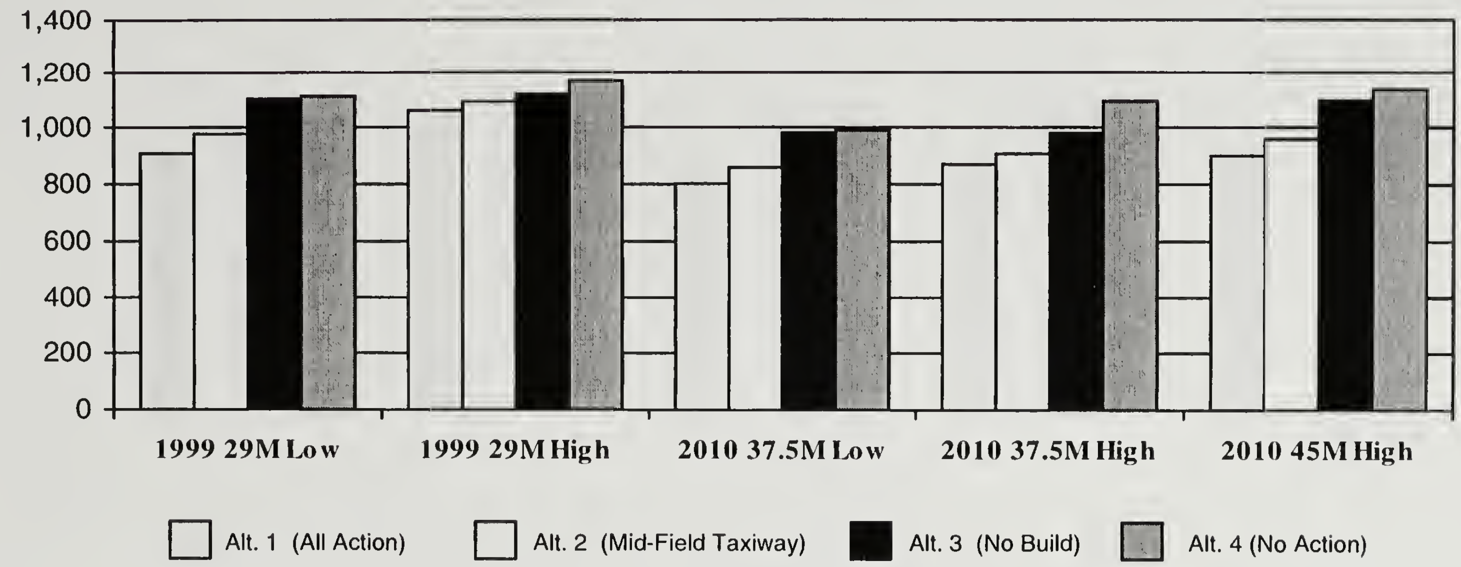


FIGURE 6.3-6 PM10 EMISSIONS INVENTORY - ALL SOURCES
(kg/day)

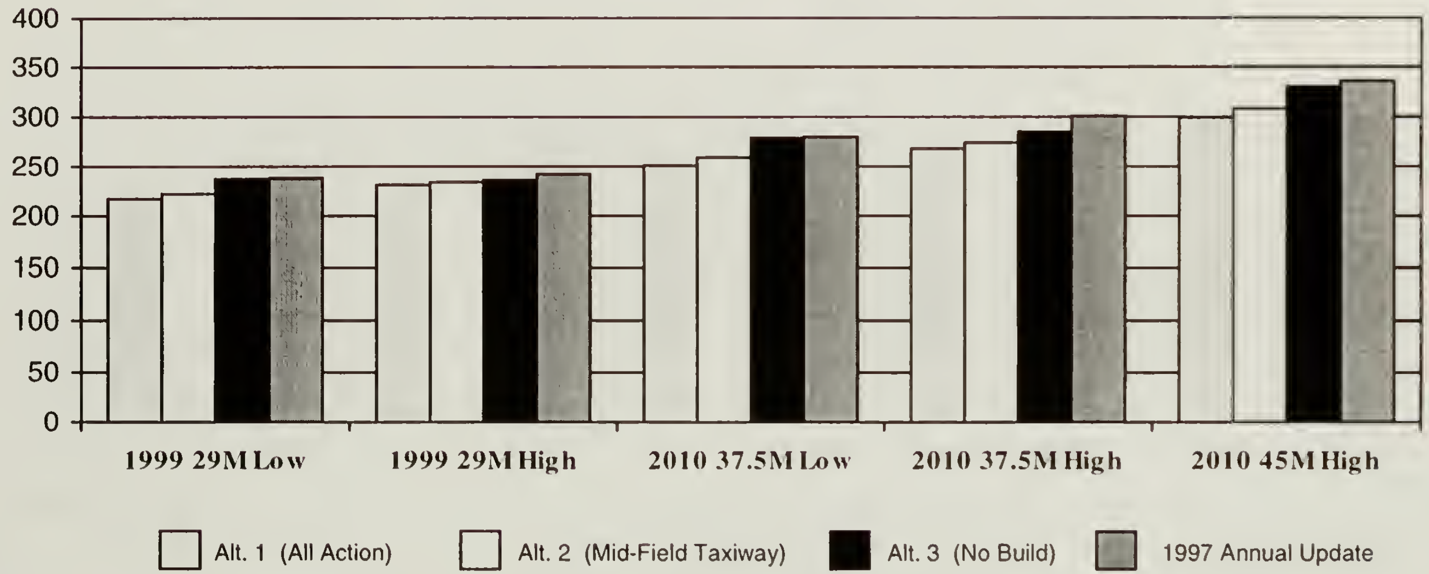
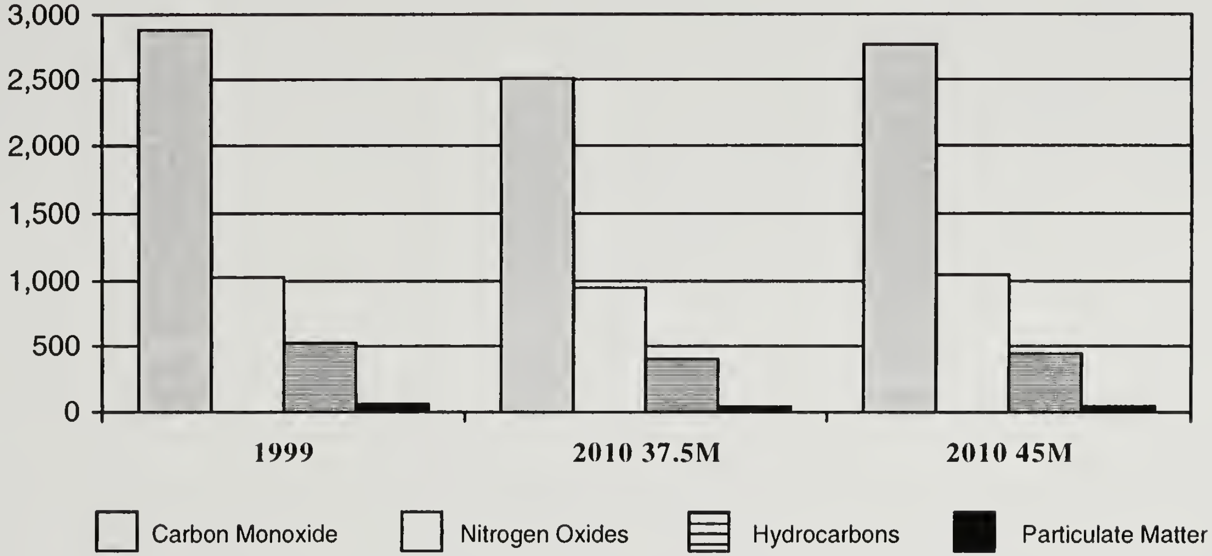


FIGURE 6.3-7 OFF-SITE MOTOR VEHICLE EMISSIONS
(kg/day)



Appendix G
Wildlife

- G.1 Letter from U.S. Fish and Wildlife Service dated April 1, 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4996

April 1, 1997

Jennifer O'Reilly
Jason M. Cortell and Assoc. Inc.
244 Second Avenue
Waltham, MA 02154

Dear Ms. O'Reilly:

This responds to your letter dated March 17, 1997 for information on the presence of federally-listed and proposed, endangered or threatened species in accordance with preparation of an environmental impact statement/environmental impact report for improvements to airfield operations at Logan International Airport in Boston, Massachusetts.

Based on information currently available to us, the only federally-listed or proposed, threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service known to occur in the project area is the endangered peregrine falcon (*Falco peregrinus*). A pair of peregrine falcons nest in downtown Boston. Falcons are predators and the Boston peregrines are known to search for prey over the clear zones and other open spaces in and around Logan Airport. However, we do not anticipate that the peregrine falcons in Boston will be adversely affected by the proposed airfield improvements.

Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required. Should project plans change, or additional information on listed or proposed species becomes available, this determination may be reconsidered.

A list of federally-designated endangered and threatened species in Massachusetts is enclosed for your information. Thank you for your cooperation and please contact Michael Amaral of this office at 603-225-1411 if we can be of further assistance regarding endangered species.

Sincerely yours,

Michael J. Bartlett
Supervisor
New England Field Office

Enclosure

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

Common Name	Scientific Name	Status	Distribution
FISHES:			
Sturgeon, shortnose*	Acipenser brevirostrum	E	Atlantic coastal waters and rivers (Conn. R.)
REPTILES:			
Turtle, bog	Clemmys muhlenbergii	PT	Berkshire County
Turtle, green*	Chelonia mydas	T	Oceanic staggler in southern New England
Turtle, hawksbill*	Eretmochelys imbricata	E	Oceanic straggler in southern New England
Turtle, leatherback*	Dermochelys coriacea	E	Oceanic summer resident
Turtle, loggerhead*	Caretta caretta	T	Oceanic summer resident
Turtle, Atlantic ridley*	Lepidochelys kempii	E	Oceanic summer resident
Turtle, Plymouth redbelly	Chrysemys rubriventris bangsi	E	Plymouth & Dukes Counties
BIRDS:			
Eagle, bald	Haliaeetus leucocephalus	T	Nesting in Quabbin Res. and along Conn. R.; entire state-migratory
Falcon, American peregrine	Falco peregrinus anatum	E	Current nesting: Boston & Springfield; entire state-migratory
Falcon, Arctic peregrine	Falco peregrinus tundrius	T	Entire state-migratory
Plover, Piping	Charadrius melodus	T	Atlantic coast
Roseate Tern	Sterna dougallii dougallii	E	Atlantic coast
MAMMALS:			
Whale, blue*	Balaenoptera nyusculus	E	Oceanic
Whale, finback*	Balaenoptera physalus	E	Oceanic
Whale, humpback*	Megaptera novaeangliae	E	Oceanic
Whale, right*	Eubalaena spp. (all species)	E	Oceanic
Whale, sei*	Balaenoptera borealis	E	Oceanic
Whale, sperm*	Physeter catodon	E	Oceanic
MOLLUSKS:			
Mussel, Dwarf wedge	Alasmidonta heterodon	E	Hampshire County
INSECTS:			
Beetle, Puritan tiger	Cicindela puritana	T	Hampshire County (Conn. River Valley)
Beetle, northeastern beach tiger	Cicindela dorsalis dorsalis	T	Dukes & Bristol Counties (beaches, Cape Cod south)
Beetle, American burying	Nicrophorus americanus	E	Penikese & Nantucket Isl., reintroduced populations
PLANTS:			
Small Whorled Pogonia	Isotria medeoloides	T	Hampshire, Essex, Hampden, Worcester, Middlesex Counties
Gerardia, Sandplain	Agalinus acuta	E	Barnstable & Dukes Counties
Bulrush, Northeastern	Scirpus ancistrochaetus	E	Franklin County

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National marine Fisheries Service.

Rev. 2-19-97

Appendix H
Cultural Resources

U.S. Department of Transportation
Federal Aviation Administration

New England Region

12 New England Executive Park
Burlington, MA 01803-5299

Ⓔ 8562
MHF = FAA

RECEIVED
OCT 08 1999
MASS. HIST. COMM

October 6, 1999

Ms. Judith B. McDonough, State Historic Preservation Officer
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, Massachusetts 02125
Attn: Gary Hammer, Director of Architectural Review

Re: Logan Airside Improvements Planning Project, EOEA #10458
Boston-Logan International Airport, Boston, MA

Dear Ms. McDonough:

The Federal Aviation Administration (FAA) and the Massachusetts Port Authority (Massport) are undertaking a study of alternatives for reducing current and projected levels of aircraft delay at Boston-Logan International Airport. The FAA is the lead federal agency for purposes of airport layout plan approval and funding approval. The FAA is also the project proponent with respect to the reduction in runway approach minimums and implementation of runway instrumentation. Massport is the project proponent for all other improvement concepts that fall within its purview as proprietor of Logan.

The FAA and Massport prepared a draft Environmental Impact Statement/Draft Environmental Impact Report (Draft EIS/EIR) for the Logan Airside Improvement Planning Project (Airside Project). A copy of the document was forwarded to the Massachusetts Historical Commission (MHC) in February 1999. The Draft EIS/EIR reflects the analytic process for identifying and reviewing the operational and environmental implications of various improvement alternatives and designates a preferred alternative for implementation. The preferred alternative includes the construction of a runway to serve commuter planes, known as Runway 14/32. The runway will be designed and approved for unidirectional use only, with all arrivals and departures taking place over Boston Harbor.

The purpose of this letter is to coordinate consultation among the FAA, Massport, and the MHC in compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800), Section 4(f) of the Department of Transportation Act of 1966, and Massachusetts General Laws Chapter 9, Sections 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71). The FAA has determined under Section 106 that the Airside Project would constitute an undertaking and that it is a type of activity that has the potential to cause effects on historic properties (36 CFR 800.3).

The Draft EIS/EIR includes an assessment of impacts of the preferred alternative on historic properties. As summarized in Section 8.6 of the Draft EIS/EIR, the proposed runway would have no direct impacts to significant historic properties; however, sound insulation mitigation could have

the potential for indirect impacts. The analysis of potential impacts was performed by comparing the 65-decibel (dB) day-night average sound level (DNL) noise contours of the No Action Alternative (Alternative 4) and the Preferred Alternative (Alternative 1A). Project impact areas for historic properties are those areas where the 65-dB DNL contour for the preferred alternative extends beyond the 65-dB DNL contour for the no action alternative. Overall, the preferred alternative reduces the population exposed to the most severe noise impacts (greater than 70dB) when compared with the no action alternative. Where the 65-dB DNL contour increases with the preferred alternative, the increase is less than 1.5-dB, a threshold of significance in Part 150.

A review of MHC and local historical commission files and field survey conducted to confirm background research resulted in the identification of historic properties in Boston, Chelsea, and Winthrop that are within the 65-dB DNL. The historic properties are enumerated below and depicted on the enclosed figures.

Boston

St. Andrews Road MHC #EB1017, East Boston
Boston Army Supply Base, MHC #RT, South Boston (NR eligible 1997)
C Street Area, MHC #RU, South Boston (NR eligible 1997)

Chelsea

A section of the Bellingham Square Historic District (NR listed 1985)
A section of the Downtown Chelsea Residential District (NR listed 1988)

Winthrop

45 Enfield Road, MHC #67
240 Pleasant Street MHC #158 (NR eligible 1997)
75 & 77 Somerset Avenue MHC #196
88 Somerset Avenue MHC #197
94 Somerset Avenue MHC #198 (NR eligible 1997)

We evaluated airport noise and land use compatibility in accordance with land use guidelines expressed in Federal Aviation Regulation (FAR), Part 150, Airport Noise Compatibility Planning (14 CFR 150). FAR Part 150 does not include guidelines specific to historic sites; however, the identified historic properties are comprised of commercial, manufacturing, and residential land uses, for which guidance is provided. In addition, general guidance within FAR Part 150 indicates that noise levels generally do not affect the relevant characteristics of urban historic districts (for example, their architectural features and recognition of their place in history). FAR Part 150 provides that all land uses are considered to be compatible with noise levels less than 65-dB DNL and that commercial and manufacturing land uses are compatible land uses within the 65-dB to 70-dB DNL. FAR Part 150 further provides that residential land uses are not compatible within the 65-dB DNL, but does allow for noise impacts to be mitigated through sound insulation of affected residential structures.

The FAA and Massport propose to mitigate noise impacts by sound insulating all affected residences, historic and non-historic, that fall within the 65-dB DNL contour for the Preferred Alternative. The structures to be included within the noise mitigation program would be subject to a detailed block-by-block analysis during project implementation. All sound insulation of historic structures would be undertaken in compliance with applicable federal and state guidelines to ensure protection of the resources. Preservation measures to maintain the existing form, integrity, and materials of the historic properties would be accomplished in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68). The FAA and Massport would consult with the MHC as it has done previously with sound insulation of historic structures impacted by other Logan projects (i.e., South Boston).

Based on the level of planning to date, the FAA has determined that the sound insulation mitigation proposed under the Preferred Alternative has the potential to cause effects on historic properties (36 CFR 800.3). Given FAA and Massports' intent to specify as a mitigation measure that sound insulation will be implemented in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68), we propose a Determination of No Adverse Effect (36 CFR 800.5 (b)) on significant historic properties.

The FAA and Massport welcome the opportunity to review in more detail the proposed undertaking, identification of historic properties, and proposed determination of effect with the MHC. Please do not hesitate to contact Maureen Cavanaugh of Frederic R. Harris, Inc. (617-371-4489) or me if you have any questions or require additional information. Thank you in advance for your careful consideration of the Logan Airside Project.

Sincerely,

John C. Silva

John C. Silva
Manager, Environmental Programs

CONCURRENCE: Judith B. McDonough

JUDITH B. McDONOUGH 12/21/99
STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION

cc: Flavio Leo, Massport
Boston Landmarks Commission
Chelsea & Winthrop Historical Commissions

Enclosures (2)

cc: Betty Desrosiers, Massachusetts Port Authority
Arthur Pugsley, Executive Office of Environmental Affairs MEPA Unit

Appendix I
Environmental Justice

- ➤ I.1 U.S. Census Bureau Poverty Thresholds – 1990
- ➤ I.2 DEP Site/Reportable Release for the City of Chelsea

U. S. Census Bureau Poverty Thresholds: 1990

U.S. Census Bureau
Poverty Thresholds: 1990

Size of Family Unit	Weighted Average Thresholds	Related Children Under 18 Years								
		None	One	Two	Three	Four	Five	Six	Seven	Eight
One person (unrelated individual)	$6,652									
Under 65 years	6,800	6,800								
65 years and over	6,268	6,268								
Two persons	8,509									
Householder under 65 years	8,794	8,752	9,009							
Householder 65 years and over	7,905	7,900	8,975							
Three persons	10,419	10,223	10,520	10,530						
Four persons	13,359	13,481	13,701	13,254	13,301					
Five persons	15,792	16,257	16,494	15,989	15,598	15,359				
Six persons	17,839	18,693	18,773	18,386	18,015	17,464	17,137			
Seven persons	20,241	21,515	21,650	21,187	20,864	20,262	19,561	18,791		
Eight persons	22,582	24,063	24,276	23,839	23,456	22,913	22,223	21,505	21,323	
Nine persons or more	26,848	28,946	29,087	28,700	28,375	27,842	27,108	26,445	26,280	25,268

Source: U.S, Census Bureau, Current Population Survey.

DEP Site/Reportable Release for the City of Chelsea

SITE/REPORTABLE RELEASE LOOK UP
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0000099	Tobin Bridge	Massport		1/15/1987	NFA	7/23/1993	No Phase		Hazardous Material
3-0000163	123 Eastern Ave	Cumberland Farms Oil Terminal		1/15/1987	Tier 2	7/30/1998	Phase IV		Oil and Hazardous Material
3-0000291	229 Marginal St	Samuel Cabot Inc.		1/15/1987	Tier IA	1/15/1990	Phase IV		Oil and Hazardous Material
3-0000292	Forbes Indus Park/Near Marginal St.	Morrell Realty Trust (Fmr)		1/15/1987	Pending	7/23/1993	Phase II		
3-0000508	333 Third St	Samuel Gordon & Sons Inc.		1/15/1987	Tier 2	5/18/1998	Phase III	A3	
3-0000548	Beacham St (Everett Line)	U.S. Postal Service		1/15/1987	Tier 2	8/8/1995	Phase IV		Oil and Hazardous Material
3-0000710	Everett Ave – Mystic Mall	Pizza Hut		10/15/1988	NDS	5/13/1996	Phase I		Hazardous Material
3-0000821	257-324 Marginal St	Northeast Petroleum		4/15/1987	RAO	10/30/1997	Phase IV	C	Oil and Hazardous Material
3-0000921	91 Crest Ave	Soldiers Home		7/15/1987	Def Tier 1B	8/2/1995	Phase I		
3-0001004	979 Broadway	Exxon Service		1/15/1990	Rao	12/2/1998	Phase V	C	Oil
3-0001186	Second St	Murray Industrial Park		1/15/1987	NFA	7/23/1993	No Phase		Hazardous Material
3-0001237	350a Beacham St	B&K Distributors		10/15/1988	NFA	5/9/1996	Phase I		Hazardous Material
3-0001755	I Forbes & Marginal Sts.	Forbes Lithographic Co. (Fmr)		1/15/1987	Tier 2	3/14/1997	Phase II		Hazardous Material
3-0001791	276 Beacham St	William St. Coal Tar Dump (Fmr)		1/15/1989	RAO	5/14/1998	Phase 1		Oil
3-0001795	295 Eastern Ave	Property		1/15/1989	Tier 2	8/9/1996	Phase II		

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0001800	102 Crescent Ave	Joseph Botti Co		1/15/1989	RAO	10/15/1997	Phase II	A1	Oil
3-0001946	Drainage Project	Mill Creek		1/15/1989	NDS	7/23/1993	No Phase		Hazardous Material
3-0002029	8-24 Griffin Way	Logan Office Complex		4/15/1989	RAO	2/12/1997	Phase I		Oil
3-0002060	11 Broadway	Petroleum Terminal		4/15/1989	Tier 2	12/21/1998	Phase II		Oil
3-0002069	1012 Broadway	American Finish & Chem Co.		4/15/1989	Tier 2	2/18/1999	Phase II		Oil and Hazardous Material
3-0002093	44-46 Arlington St	Oscar Cutlery Co.		4/15/1989	NFA	9/27/1993	Phase II		Oil And Hazardous Material
3-0002107	148 Hawthorne St	C&C Oil		4/15/1989	Def Tier IB	8/2/1996	Phase I		Oil
3-0002124	110- 112 Prescott Ave	Property		4/15/1989	Pending NFA	7/15/1996	Phase I		Oil
3-0002211	281 Eastern Ave	Gulf Oil Terminal		10/15/1989	Def Tier 1B	8/2/1996	No Phase		Oil
3-0002248	251 Everett Ave	BP Gasoline Station		10/15/1989	RAO	11/17/1997	Phase III	A2	Oil
3-0002262	20-30 Eden St	Tank Farm (Fmr)		1/15/1990	RAO	2/5/1997	Phase II	A2	Oil
3-0002298	340 Marginal St	Chelsea Creek Headworks		1/15/1990	Tier 2	8/2/1996	Phase III		Oil
3-0002445	190 Everett Ave	Nasco Inc		1/15/1993	RAO	4/21/1999	Phase II	A2	Oil and Hazardous Material
3-0002564	140-180 Spruce St	Property		7/15/1993	Def Tier 1B	6/16/1998	Phase II		Oil and Hazardous Material
3-0002645	99 Marginal St	Belcher Tank Farm		1/15/1990	RAO	3/14/1997	Phase II	A3	Oil
3-0002994	211 Everett Ave	Property		10/15/1991	NDS	4/19/1994	No Phase		Oil
3-0003208	160-180 Second St	Property		7/15/1990	NFA	4/10/1996	No Phase		Oil
3-0003231	Second St	Property		7/15/1990	NFA	6/23/1997	Phase II		Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0003550	111 Eastern Ave	Amoco Petroleum Terminal		4/15/1991	RAO	11/10/1997	Phase IV	C	Oil and Hazardous Material
3-0003669	90 New England Produce Ctr.	New England Produce Center		7/15/1991	RAO	8/9/1996	Phase II	C	Oil and Hazardous Material
3-0003671	181 Spencer St	Emtex		7/15/1991	RAO	5/20/1997	Phase I		Oil
3-0004246	449 Crescent Ave	Chelsea Housing Authority		1/15/1993	RAO	1/15/1999	Phase II	A2	Oil
3-0004410	156 Williams St	Top Gas Station		7/15/1993	RAO	8/4/1997	No Phase		Oil
3-0004411	3-5 Saipan Rd	Chelsea Housing Authority		7/15/1993	NFA	6/5/1996	No Phase		Oil
3-0004611	101 Park St	Auto Dealership (Former)		10/1/1993	Tier 2	8/8/1997	Phase II		Oil and Hazardous Material
3-0004713	150 Sagamore Ave	Property		10/1/1993	NFA	6/5/1996	No Phase		Oil
3-0004805	311 Chestnut St	Metropolitan Credit Union		10/1/1993	NFA	6/5/1996	No Phase		Oil
3-0010105	111 Eastern Ave	Amocotank Farm	Two Hour	10/26/1993	RTN Closed	11/8/1994	No Phase		Oil
3-0010112	90 Spencer Ave	No Location Aid	Two Hour	10/27/1993	RAO	10/27/1994	Phase II	A1	Oil
3-0010156	Suffolk St/Shurtleff St	No Location Aid	Two Hr	11/5/1993	RAO	4/13/1994	No Phase	A1	Oil
3-0010214	Revere Beach Pkwy	By Webster Ave	Two Hour	11/22/1993	RAO	3/8/1994	No Phase		Oil
3-0010222	315 Crescent Ave	Vacant lot	72 Hour	11/23/1993	RAO	11/25/1994		A3	Oil
3-0010382	721 Broadway	No Location Aid	Two Hour	12/31/1993	RAO	12/13/1994		A2	Oil
3-0010476	281 Eastern Ave	Gulf Terminal-Chelsea Creek	Two Hour	1/24/1994	RAO	10/10/1995		A1	Oil
3-0010478	284 Eastern Ave	No Location Aid	Two Hour	1/26/1994	RAO	2/17/1995		A2	Oil
3-0010491	11 Broadway	Chelsea Creek- Off Loading Dock	Two Hour	1/30/1994	RAO	4/1/1994	No Phase	A1	Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0010556	215 Williams St	Former Native Poultry Property	Two Hour	2/9/1994	RAO	1/31/1995	No Phase	A3	Oil
3-0010608	200 Second St	No Location Aid	120 Day	11/30/1993	RAO	11/30/1993	No Phase	B1	Oil and Hazardous Material
0010688	215 Williams St	No Location Aid	120 Day	2/1/1994	RAO	1/31/1995	No Phase		Hazardous Material
3-0010694	285 Central Ave	Corner of Eastern Ave	120 Day	2/24/1994	RAO	1/30/1997	Phase II	B2	Hazardous Material
3-0010709	281 Eastern Ave	Gulf Oil Terminal	Two Hour	3/19/1994	RAO	5/17/1994	No Phase	A1.	Oil
3-0010750	315 Crescent St	Parcel 1,2,4,5	120 Day	3/18/1994	RAO	11/15/1996	Phase II	A3	Oil
3-0010776	90-104 Williams St	Below Williams St section of Tobin Bridge	Two Hour	3/30/1994	RAO	5/31/1994	No Phase	Al.	Oil
3-0010822	135 Chestnut	No Location	Two Hour	4/11/1994	RAO	6/6/1994	No Phase	Al	Oil
3-0010924	Beacham St	New England Produce Center	Two Hour	4/27/1994	RAO	6/23/1994	No Phase	A1	Oil
3-0010979	Spruce St	Market Basket	Two Hour	5/10/1994	RAO	8/5/1994	No Phase	A2	Hazardous Material
3-0010989	155 Cresent St	Across from Manson Corp	72 Hour	5/11/1994	Def Tier 1B	5/18/1995	No Phase		Oil
3-0011296	412 Eastern Ave	No Location Aid	72 Hour	7/13/1994	Def Tier 1B	7/20/1995	No Phase		Oil
3-0011320	11 Broadway	Petroleum Terminal	Two Hour	7/16/1994	RTN Closed	6/16/1995	No Phase		Oil
3-0011321	37 Marginal Ave	M/V Milta	Two Hour	7/18/1994	RAO	9/22/1994	No Phase	A1	Oil
3-0011453	281 Everett Ave	Memorial Stadium	72 Hour	8/10/1994	RAO	10/11/ 1994	No Phase	A2	Oil
3-0011596	295 Eastern Ave	No Location Aid	Two Hour	9/15/1994	Tier 2	8/9/1996	Phase II	Al	Oil
3-0011620	980 Broadway	Vacant Building	120 Day	9/22/1994	RAO	9/22/1995	No Phase	A1	Oil
3-0011647	170-180 Walnut St	Williams School	120 Day	9/22/1994	RAO	8/28/1998	Phase II	A3	Hazardous Material

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0011673	257 Marginal St	No Location Aid	72 Hour	9/30/1994	RAO	10/30/1997	No Phase	C	Oil and Hazardous Material
3-0011792	Chelsea Creek at Marginal St	Manhole 25291	Two Hour	10/31/1994	RAO	2/16/1995	No Phase	Al	Oil
3-0011842	423 Washington Ave	Opposite Pratville School Fremont St	Two Hour	11/9/1994	RAO	12/14/1994	No Phase	Al	Oil
3-0011846	99 Marginal St	Chelsea Creek/Coastal Oil	Two Hour	11/11/1994	RAO	11/8/1995	No Phase	Al	Hazardous Material
3-0011905	123 Eastern Ave	Gulf Terminal Chelsea Creek	Two Hour	11/29/1994	RTN Closed	8/19/1996	No Phase		Oil
3-0012152	110rangest	No Location Aid	Two Hour	2/8/1995	RAO	3/3/1995	No Phase	Al	Oil
3-0012360	380 Beacham St	DPW Yard	72 Hour	4/7/1995	Tier 2	4/12/1996	Phase IV		Oil
3-0012556	76 Congress Ave	Shurtleff School	120 Day	6/6/1995	RAO	6/3/1999	Phase II	B1	Oil and Hazardous Material
3-0012625	158 Carter St	No Location Aid	120 Day	6/26/1995	RTN Closed	1/23/1997	No Phase		Hazardous Material
3-0012643	Everett Ave	No Location Aid	Two Hour	6/29/1995	RAO	8/31/1995	No Phase	A1	Oil
3-0012748	17 Normandy Rd	No Location Aid	72 Hour	7/28/1995	RAO	4/12/1996	No Phase	A1	Oil
3-0012784	39 Normandy Rd	Chelsea Housing Authority	72 Hour	8/8/1995	RAO	4/12/1996	No Phase	A1	Oil
3-0012785	41 Normandy Rd	Chelsea Housing Authority	72 Hour	8/8/1995	RAO	4/12/1996	No Phase	A1	Oil
3-0012790	40-42 Gerrish Ave	Off Griffin Way near Eastern Ave	120 Day	8/3/1995	RAO	4/2/1996	Phase II	B2	Hazardous Material
3-0012837	4 Saipan Rd	No Location Aid	72 Hour	8/23/1995	RAO	4/12/1996	No Phase	Al	Oil
3-0012838	6 Saipan Rd	No Location Aid	72 Hour	8/23/1995	RAO	4/12/1996	No Phase	Al.	Oil
3-0012845	8 Saipan Rd	No Location	72 Hour	8/24/1995	RAO	4/12/1996	No Phase	A2	Oil
3-0012846	10 Saipan Rd	Chelsea Housing Authority	72 Hour	8/24/1995	RAO	4/12/1996	No Phase	A2	Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0012859	979 Broadway	Exxon	Two Hour	8/28/1995	RTN Closed	12/26/1995	No Phase		Oil
3-0012865	374 Revere Beach Pkwy Rte 16	Chelsea Housing Authority	72 Hour	8/30/1995	RAO	4/12/1996	No Phase	Al	Oil
3-0012867	376 Revere Beach Pkwy Rte 16	Chelsea Housing Authority	72 Hour	8/30/1995	RAO	4/12/1996	No Phase	Al	Oil
3-0012868	12 Saipan Rd	Chelsea Housing Authority	72 Hour	8/30/1995	RAO	4/12/1996	No Phase	A2	Oil
3-0012869	13 Saipan Rd	Chelsea Housing Authority	72 Hour	8/30/1995	RAO	4/12/1996	No Phase	A2	Oil
3-0012913	31-33 Marlboro St	No Location Aid	Two Hour	9/10/1995	RAO	9/18/1996	No Phase	A3	Oil
3-0013032	35 Burma Rd	No Location Aid	72 Hour	10/13/1995	RAO	4/12/1996	No Phase	A2	Oil
3-0013033	37 Burma Rd	No Location Aid	72 Hour	10/13/1995	RAO	4/12/1996	No Phase	A2	Oil
3-0013122	122 Broadway	No Location Aid	120 Day	11/7/1995	Tier 2	11/14/1996	Phase II		Oil and Hazardous Material
3-0013432	16 Cheever St	No Location Aid	Two Hour	2/8/1996	RAO	6/6/1996	No Phase	A2	Oil
3-0013448	Broadway/William St	Paved Roadway at Intersection	Two Hour	2/13/1996	RAO	4/5/1996	No Phase	Al	Oil
3-0013498	1100 Revere Beach Pkwy	Webster St	120 Day	2/4/1997	Def Tier 1B	3/3/1998	No Phase		Oil
3-0013541	1000 Justin Dr	Parking Lot	120 Day	3/7/1996	Def Tier 1B	3/14/1997	No Phase		Oil
3-0013542	1000 Justin Dr	Marina	120 Day	3/7/1996	Def Tier 1B	3/14/1997	No Phase		Hazardous Material
3-0013544	11 Broadway St	Chelsea Creek	Two Hour	3/11/1996	RAO	5/20/1996	No Phase	Al.	Oil
3-0013665	295 Eastern Ave	Glen Mor Fuel Oil Co	72 Hour	4/11/1996	Tier 2	8/9/1996	Phase II		Oil
3-0013796	175 Hawthorne St	Former Post Office	120 Day	5/20/1996	RAO	2/20/1997	No Phase	B1	Oil
3-0013919	151 Everett Ave	Spruce St	120 Day	7/10/1996	RAO	8/10/1999	Phase II	A3	Oil and Hazardous Material
3-0013928	281 Eastern Ave	No Location Aid	Two Hour	6/25/1996	RTN Closed	6/19/1997	No Phase		Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0014071	99 Marginal St	Tank Farm	Two Hour	7/31/1996	RAO	9/25/1996	No Phase	Al	Hazardous Material
3-0014122	Rte 16/Pkwy Plaza	Near Bradlees/at Webster Avenue	Two Hour	8/15/1996	RAO	10/ 11/ 1996	No Phase	Al.	
3-0014181	22 Willow St	Willow/Suffolk/Congress/ Highland	72 Hour	8/30/1996	Tier 2	9/8/1997	Phase II		Oil
3-0014339	22 Willow St	Willow/Suffolk/C	120 Day	10/10/1996	Tier 2	9/8/1997	Phase II		Oil and Hazardous Material
3-0014476	62 Broadway	Tobin Bridge Maintenance Garage	120 Day	11/6/1996	RAO	11/10/1997	No Phase	A2	Oil
3-0014675	Beacon St	Fr Tobin Bridge Exit	Two Hour	12/30/1996	RAO	2/20/1997	No Phase	Al	Oil
3-0014812	300 Beecham St	N.E. Produce Market,	Two Hour	2/11/1997	RAO	4/7/1997	No Phase	Al.	Oil
3-0014827	120 Eastern Ave	No Location Aid	120 Day	2/13/1997	RAO	4/30/1999	No Phase	A3	Oil
3-0014846	324 Marginal St	No Location Aid	72 Hour	2/21/1997	DPS	10/30/1997	No Phase		Hazardous Material
3-0014917	281 Eastern Ave	Gulf Oil Terminal	Two Hour	3/15/1997	RTN Closed	3/17/1998	No Phase		Oil
3-0015111	11 Broadway	Chelsea Terminal	Two Hour	5/17/1997	RTN Closed	7/23/1997	No Phase		Oil
3-0015159	571 Washington St	Pezzi Service Center	72 Hour	6/3/1997	RAO	3/27/1998	No Phase	A2	Oil
3-0015176	19 Park St	Old Police Station	72 Hour	6/6/1997	RAO	6/4/1998	No Phase	A2	Oil
3-0015177	28 Gerrish Ave	No Location Aid	Two Hour	6/6/1997	Tier 2	6/15/1998	Phase II		Oil
3-0015178	Tobin Bridge & Beacon St Ramp	No Location Aid	Two Hour	6/7/1997	RAO	7/28/1997	No Phase	Al	Oil
3-0015259	122 Broadway	No Location Aid	120 Day	6/16/1997	RTN Closed	5/19/1998	No Phase		Oil
3-0015318	85 Market St	Striker Transportation	Two Hour	7/21/1997	Def Tier 1B	7/28/1998	No Phase		Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0015330	80 Eastern Ave	Corner of Cottage St & Bellingham St	120 Day	7/24/1997	RAO	7/24/1997	No Phase	A2	Hazardous Material
3-0015365	295 Eastern Ave	Glenmor Oil	Two Hour	7/30/1997	RAO	10/1/1997	No Phase	Al	Oil
3-0015421	99 Everett Ave	No Location Aid	120 Day	8/13/1997	RAO	8/13/1997	No Phase	A2	Oil
3-0015493	380 Beacham St	DPW Garage	72 Hour	9/4/1997	RTN Closed	11/3/1997	No Phase		Oil and Hazardous Material
3-0015648	1100 Revere Beach Pkwy	Intersection of Webster Ave and Gillooly Rd	120 Day	10/17/1997	Tier 2	11/3/1998	Phase II		Oil and Hazardous Material
3-0015990	39 Winnisimmet St	Fitzgerald Shipyard	120 Day	2/6/1998	Tier 2	1/28/1999	Phase II		Oil and Hazardous Material
3-0016509	357 Beacham St	At Market St	120 Day	2/13/1998	RAO	3/5/1998	No Phase	B2	Hazardous Material
3-0016572	281 Eastern Ave	No Location Aid	Two Hour	3/9/1998	RAO	7/16/1998	No Phase	A2	Oil
3-0016789	201 Maple St	No Location Aid	72 Hour	5/13/1998	RAO	5/19/1999	No Phase	A2	Oil
3-0017010	505 Washington Ave	No Location Aid	120 Day	7/3/1998	Tier 2	6/28/1999	Phase II		Oil
3-0017025	10 Broadway	No Location Aid	Two Hour	7/11/1998	RAO	1/12/1999	No Phase	Al	Hazardous Material
3-0017142	215 Williams St	No Location Aid	Two Hour	8/12/1998	RAO	8/12/1999	No Phase	Al	Oil
3-0017266	Marginal St	MWRA Right of Way	120 Day	9/1/1998	Tier 2	9/1/1999	Phase II		Oil and Hazardous Material
3-0017267	Vale And Carter Sts.	North of Intersection	120 Day	9/1/1998	Tier 2	9/7/1999	Phase II		Oil and Hazardous Material
3-0017357	99 Marginal St	Coastal Oil Bulk Oil Terminal	120 Day	9/28/1998	RAO	9/28/1998	No Phase	B1	Hazardous Material
3-0017398	145 Webster Ave	Parkway Plaza	Two Hour	10/8/1998	Preclassified	10/8/1998	No Phase		Hazardous Material
3-0017421	38 Sagamore St	DPW Public Safety Building.	72 Hour	10/14/1998	RAO	2/11/1999	No Phase	A2	Oil

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0017467	11 Broadway	Loading Rack E	Two Hour	10/29/1998	RAO	12/30/1998	No Phase	Al	Oil
3-0017471	553a Washington Ave	No Location Aid	72 Hour	10/22/1998	Preclassified	10/22/1998	No Phase		Oil
3-0017597	51 Park St	Greg's Service Station	72 Hour	11/19/1998	RAO	3/8/1999	No Phase	A2	Oil
3-0017621	Williams St	Near Chestnut St	72 Hour	11/13/1998	Preclassified	11/13/1998	No Phase		Oil and Hazardous Material
3-0017640	1020 Revere Beach Pkwy	No Location Aid	120 Day	11/25/1998	Preclassified	11/25/1998	No Phase		Hazardous Material
3-0017646	Beacham St	Pole 11	Two Hour	11/29/1998	RAO	12/15/1998	No Phase	Al.	Oil
3-0017653	11 Broadway	Near Marginal Way and Medford St	Two Hour	11/30/1998	RAO	1/26/1999	No Phase	Al	Oil
3-0017722	2 Griffin Way	No Location Aid	120 Day	12/11/1998	Preclassified	12/11/1998	No Phase		Oil
3-0017739	11 Broadway	No Location Aid	Two Hour	12/14/1998	RAO	2/12/1999	No Phase	Al	Oil
3-0017752	380 Beacham St	Chelsea Dept of Public Works	72 Hour	12/18/1998	Preclassified	12/18/1998	No Phase		Oil
3-0017824	11 Broadway	Loading Rack M	Two Hour	1/6/1999	RAO	3/5/1999	No Phase	Al	Oil
3-0017856	31 Second St	No Location Aid	72 Hour	1/12/1999	Preclassified	1/12/1999	No Phase		Oil
3-0017914	203 Everett Ave	Intersection with Maple St	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Hazardous Material
3-0017915	204 Maple St	Intersection with Beech St	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Oil and Hazardous Material
3-0017916	144 Beech St	No Location Aid	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Hazardous Material
3-0017917	144 Through 155 Beech St	Intersection with Carter St	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Oil
3-0017918	177 Everett Ave	Intersection with Maple St	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Hazardous Material

SITE/REPORTABLE RELEASE LOOK UP (continued)
CITY/TOWN OF CHELSEA

Release Tracking #(RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date	Compliance Status	Date	Phase	RAO Class	Chemical Type
3-0017919	211 Everett Ave	No Location Aid	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Oil and Hazardous Material
3-0017920	190 Through 200 Spruce St	Intersection with Beech St	120 Day	1/25/1999	Preclassified	1/25/1999	No Phase		Hazardous Material
3-0018006	644 Washington St	No Location Aid	72 Hour	2/18/1999	Preclassified	2/18/1999	No Phase		Oil
3-0018052	11 Broadway	Near Marginal Way and Medford St	Two Hour	3/4/1999	Preclassified	3/4/1999	No Phase		Oil
3-0018080	281 Eastern Ave	No Location Aid	Two Hour	3/11/1999	RTN Closed	7/15/1999	No Phase		Oil
3-0018146	201 Marginal St	No Location Aid	120 Day	3/31/1999	Preclassified	3/31/1999	No Phase		Hazardous Material
3-0018195	37 Marginal St	Eastern Minerals Salt Dock	Two Hour.	4/13/1999	RAO	6/21/1999	No Phase	Al	Oil
3-0018612	135 Library St	Shawmut Printing Parking Lot	120 Day	7/2/1999	RAO	7/2/1999	No Phase	B1	Hazardous Material
3-0018630	505 Washington St	No Location Aid	72 Hour	8/12/1999	Preclassified	8/12/1999	No Phase		Oil
3-0018693	211 Everett St	Maple St	120 Day	8/23/1999	Preclassified	8/23/1999	No Phase		Hazardous Material
Total of 167 Records Matched									

Source: Massachusetts Department of Environmental Protection's Internet Site List 10/29/99.

Appendix J
Construction

Construction Equipment Detail

- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MIDFIELD TAXIWAY - DAYS																									
Bulldozer - Small	90										2	2	2												
Bulldozer - Large	80										4	4													
Excavators - Small											4														
Excavators - Medium	80										3	3													
Excavators - Large	90										2														
Front End Loaders - Large	80										4	4													
Graders - Small	35										4		2												
Graders - Large	70											2													
Dump Trucks - Small	60										2	2	4												
Dump Trucks - Large	70										12	25	10												
Trailer Dump Trucks - Large	70										8	16	4												
Vibratory Compactors - Large	80										8	12	8												
Plate Compactors - Small	30										4	4	2												
Static Compactors - Large	80											2	1												
Water Trucks	50										2	2	2												
Backhoes - Small	60											2	2												
Backhoes - Large	60										2	2													
Stake Bed Trucks - Small	20												2												
Stake Bed Trucks - Medium	20										4	4	1												
Stake Bed Trucks - Large	20											2	2												
Pick Up Trucks - Small	35										6	8	6												
Flatbed Trucks for Equipment Transport	5										2	3	2												
Sweepers - Small	90										2	2	2												
Sweepers - Large	90										2	4	2												
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	50										2	4	2												
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium																									
Electrical Generators W/Power Tools																									
Paving Machine - Large	80											2	1												
Pavement Saw - Large																									
Core Drill Machine	30											1	1												
Liquid Ashphalt Tanker Trucks	30											1	1												
Pavement Milling Machines - Small																									
Pavement Milling Machines - Medium																									
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large																									
Mobile Cranes - Small																									
Mobile Cranes - Medium	30										2														
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MIDFIELD TAXIWAY - NIGHTS																									
(10:00 p.m. - 6:00 a.m.)																									
Bulldozer - Small	60											2													
Bulldozer - Large	60											4													
Excavators - Small																									
Excavators - Medium	60											3													
Excavators - Large																									
Front End Loaders - Large	70											4													
Graders - Small																									
Graders - Large	60											2													
Dump Trucks - Small	50											2													
Dump Trucks - Large	70											25													
Trailer Dump Trucks - Large	70											16													
Vibratory Compactors - Large	80											12													
Plate Compactors - Small	30											4													
Static Compactors - Large	80											2													
Water Trucks	50											2													
Backhoes - Small	70											2													
Backhoes - Large																									
Stake Bed Trucks - Small	20											4													
Stake Bed Trucks - Medium	20											2													
Stake Bed Trucks - Large	20											8													
Pick Up Trucks - Small	35											3													
Flatbed Trucks for Equipment Transport	5											2													
Sweepers - Small	90											2													
Sweepers - Large	90											4													
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	40											4													
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium	90											15													
Electrical Generators W/Power Tools	60											8													
Paving Machine - Large	80											2													
Pavement Saw - Large	20											2													
Core Drill Machine	30											1													
Liquid Ashphalt Tanker Trucks	30											1													
Pavement Milling Machines - Small	20											1													
Pavement Milling Machines - Medium	35											2													
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large	20											1													
Mobile Cranes - Small																									
Mobile Cranes - Medium	30											1													
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOR ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	YEAR 1 Q1	YEAR 1 Q2	YEAR 1 Q3	YEAR 1 Q4	YEAR 2 Q1	YEAR 2 Q2	YEAR 2 Q3	YEAR 2 Q4	YEAR 3 Q1	YEAR 3 Q2	YEAR 3 Q3	YEAR 3 Q4	YEAR 4 Q1	YEAR 4 Q2	YEAR 4 Q3	YEAR 4 Q4	YEAR 5 Q1	YEAR 5 Q2	YEAR 5 Q3	YEAR 5 Q4	YEAR 6 Q1	YEAR 6 Q2	YEAR 6 Q3	YEAR 6 Q4
RUNWAY 14-32 - DAYS																									
Bulldozer - Small	70					4	2	2	2																
Bulldozer - Large	80					7	2																		
Excavators - Small																									
Excavators - Medium	70					3	2	2																	
Excavators - Large	80					4	1																		
Front End Loaders - Large	70					6	2	2	1																
Graders - Small	50						1	1	1																
Graders - Large	60					2	2	1	1																
Dump Trucks - Small	60					6	4	2	2																
Dump Trucks - Large	70					35	25	20	5																
Trailer Dump Trucks - Large	70					20	16	10	2																
Vibratory Compactors - Large	80					6	6	6	2																
Plate Compactors - Small	30					4	4	4																	
Static Compactors - Large	80					2	2	2																	
Water Trucks	50					5	3	3	1																
Backhoes - Small	60						2	2	1																
Backhoes - Large	60					4	2	1																	
Stake Bed Trucks - Small	20					2	2	2	2																
Stake Bed Trucks - Medium	20					4			1																
Stake Bed Trucks - Large	20					4	2	2																	
Pick Up Trucks - Small	35					18	14	8	6																
Flatbed Trucks for Equipment Transport	5					3	2	2																	
Sweepers - Small	90					2	2	2	1																
Sweepers - Large	90					6	4	4	2																
Air Compressors W/Tools - Small	30						1	1																	
Air Compressors W/Tools - Medium	40					4	2	2	1																
Air Compressors W/Tools - Large	40					3	2																		
Light Towers(generator powered) - Medium	50					16																			
Electrical Generators W/Power Tools	40					12	18	6	2																
Paving Machine - Large	70					2	2	2																	
Pavement Saw - Large	20					2	2	2																	
Core Drill Machine	20					1	1	1																	
Liquid Ashphalt Tanker Trucks	30					1	1	1																	
Pavement Milling Machines - Small	20					1	1	1																	
Pavement Milling Machines - Medium	30					1		1																	
Pavement Milling Machines - Large	30						1																		
Vermeer Trenching Machine - Large	25					1	1	1																	
Mobile Cranes - Small																									
Mobile Cranes - Medium	40					1	1																		
Mobile Cranes - Large	40					1																			
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small	70					1																			
Backhoes W/Hoe Rams - Large	70					2																			
Cutting Torches	70					6																			
Demolition Hammers	40					2																			

NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

		NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
EQUIPMENT SOURCE	U.F.(%)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
RUNWAY 14-32 - NIGHTS (10:00 p.m. - 6:00a.m.)																									
Bulldozer - Small	50						1																		
Bulldozer - Large	40						2																		
Excavators - Small																									
Excavators - Medium	40						2																		
Excavators - Large																									
Front End Loaders - Large	50						2																		
Graders - Small	50						1																		
Graders - Large	50						1																		
Dump Trucks - Small	60						2																		
Dump Trucks - Large	70						25																		
Trailer Dump Trucks - Large	70						16																		
Vibratory Compactors - Large	80						6																		
Plate Compactors - Small	30						4																		
Static Compactors - Large	70						2																		
Water Trucks	50						2																		
Backhoes - Small	50						2																		
Backhoes - Large																									
Stake Bed Trucks - Small	20						2																		
Stake Bed Trucks - Medium																									
Stake Bed Trucks - Large	20						2																		
Pick Up Trucks - Small	35						8																		
Flatbed Trucks for Equipment Transport	5						2																		
Sweepers - Small	90						2																		
Sweepers - Large	90						4																		
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	40						2																		
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium	90						12																		
Electrical Generators W/Power Tools	70						6																		
Paving Machine - Large	80						2																		
Pavement Saw - Large	20						2																		
Core Drill Machine	30						1																		
Liquid Ashphalt Tanker Trucks	30						1																		
Pavement Milling Machines - Small	20						1																		
Pavement Milling Machines - Medium	35						1																		
Pavement Milling Machines - Large	35						1																		
Vermeer Trenching Machine - Large	20						1																		
Mobile Cranes - Small																									
Mobile Cranes - Medium																									
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOR ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SOUTHWEST CORNER - DAYS																									
Bulldozer - Small	30																1								
Bulldozer - Large																									
Excavators - Small																									
Excavators - Medium	30															1									
Excavators - Large																									
Front End Loaders - Large	30															1									
Graders - Small	30																1								
Graders - Large																									
Dump Trucks - Small	30															2	2								
Dump Trucks - Large	30															3	2								
Trailer Dump Trucks - Large																									
Vibratory Compactors - Large	30															1									
Plate Compactors - Small	30															2	2								
Static Compactors - Large	30																								
Water Trucks	30															1	1								
Backhoes - Small	30															1	2								
Backhoes - Large	30															1									
Stake Bed Trucks - Small	20															1									
Stake Bed Trucks - Medium																	2								
Stake Bed Trucks - Large	15																								
Pick Up Trucks - Small	20															8	6								
Flatbed Trucks for Equipment Transport	5															1	1								
Sweepers - Small	90															2	1								
Sweepers - Large	90															2	1								
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	40															2									
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium																									
Electrical Generators W/Power Tools	20															2									
Paving Machine - Large																									
Pavement Saw - Large																									
Core Drill Machine																									
Liquid Ashphalt Tanker Trucks																									
Pavement Milling Machines - Small																									
Pavement Milling Machines - Medium																									
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large	20															1									
Mobile Cranes - Small																									
Mobile Cranes - Medium	20															1									
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOFALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SOUTHWEST CORNER - NIGHTS (10:00 p.m. - 6:00 a.m.)																									
Bulldozer - Small	30																1								
Bulldozer - Large																									
Excavators - Small	50														1										
Excavators - Medium	50														1										
Excavators - Large																									
Front End Loaders - Large	70														2	1	1								
Graders - Small	50														1		1								
Graders - Large																									
Dump Trucks - Small	40														2		2								
Dump Trucks - Large	60														14	10	12								
Trailer Dump Trucks - Large	60														6	4	4								
Vibratory Compactors - Large	70														6	4	4								
Plate Compactors - Small	30														2	2	2								
Static Compactors - Large	70														2	2	2								
Water Trucks	50														2	1	2								
Backhoes - Small															1	1	2								
Backhoes - Large	70														1										
Stake Bed Trucks - Small	20														2	2	2								
Stake Bed Trucks - Medium	20														1		2								
Stake Bed Trucks - Large	20														1	1	1								
Pick Up Trucks - Small	35														8	6	8								
Flatbed Trucks for Equipment Transport	5														2	1	1								
Sweepers - Small	90														2	2	2								
Sweepers - Large	90														4	4	4								
Air Compressors W/Tools - Small	30														1	1	1								
Air Compressors W/Tools - Medium	40														2	2	2								
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium	90														16	16	16								
Electrical Generators W/Power Tools	70														6	4	4								
Paving Machine - Large	80														1	1	1								
Pavement Saw - Large	20														2	2	2								
Core Drill Machine	30														1	1	1								
Liquid Ashphalt Tanker Trucks	30														1	1	1								
Pavement Milling Machines - Small	20														1	1	1								
Pavement Milling Machines - Medium	35														1	1	1								
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large	30														1										
Mobile Cranes - Small																									
Mobile Cranes - Medium	30														1										
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOFALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

		NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
EQUIPMENT SOURCE	U.F.(%)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
EXTEND TAXIWAY D - DAYS																									
Bulldozer - Small	50																		1	1					
Bulldozer - Large	40																		2	1					
Excavators - Small	40																		1	1					
Excavators - Medium	40																		2	1					
Excavators - Large																									
Front End Loaders - Large	40																		2	2					
Graders - Small																									
Graders - Large	40																		1	1					
Dump Trucks - Small	60																		4	2					
Dump Trucks - Large	70																		25	18					
Trailer Dump Trucks - Large	70																		6	4					
Vibratory Compactors - Large	70																		6	4					
Plate Compactors - Small	30																		4	2					
Static Compactors - Large	30																		2	1					
Water Trucks	30																		2	2					
Backhoes - Small	40																		3	2					
Backhoes - Large	40																		1						
Stake Bed Trucks - Small	20																		1	1					
Stake Bed Trucks - Medium	20																		1	1					
Stake Bed Trucks - Large	20																		1	1					
Pick Up Trucks - Small	35																		8	8					
Flatbed Trucks for Equipment Transport	5																		2	2					
Sweepers - Small	90																		2	2					
Sweepers - Large	90																		4	4					
Air Compressors W/Tools - Small	20																		1	1					
Air Compressors W/Tools - Medium	20																		3	2					
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium																									
Electrical Generators W/Power Tools	20																		2	2					
Paving Machine - Large	70																		1	1					
Pavement Saw - Large																									
Core Drill Machine	20																		1	1					
Liquid Ashphalt Tanker Trucks	20																		1	1					
Pavement Milling Machines - Small																									
Pavement Milling Machines - Medium																									
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large																									
Mobile Cranes - Small																									
Mobile Cranes - Medium	20																		1	1					
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
EXTEND TAXIWAY D - NIGHTS (10:00 p.m. - 6:00 a.m.)																									
Bulldozer - Small	30																			1					
Bulldozer - Large																									
Excavators - Small																									
Excavators - Medium	40																			1					
Excavators - Large																									
Front End Loaders - Large	30																			1					
Graders - Small	30																			1					
Graders - Large																									
Dump Trucks - Small	60																			2					
Dump Trucks - Large	70																			14					
Trailer Dump Trucks - Large	70																			4					
Vibratory Compactors - Large	70																			4					
Plate Compactors - Small	20																			2					
Static Compactors - Large	70																			1					
Water Trucks	30																			2					
Backhoes - Small	25																			1					
Backhoes - Large	25																			1					
Stake Bed Trucks - Small	20																			1					
Stake Bed Trucks - Medium	20																			1					
Stake Bed Trucks - Large	20																			1					
Pick Up Trucks - Small	35																			8					
Flatbed Trucks for Equipment Transport	5																			2					
Sweepers - Small	90																			2					
Sweepers - Large	90																			4					
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	30																			2					
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium	90																			12					
Electrical Generators W/Power Tools	40																			4					
Paving Machine - Large	70																			1					
Pavement Saw - Large	30																			2					
Core Drill Machine	20																			1					
Liquid Asphalt Tanker Trucks	20																			1					
Pavement Milling Machines - Small	10																			1					
Pavement Milling Machines - Medium	20																			1					
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large	10																			1					
Mobile Cranes - Small																									
Mobile Cranes - Medium	10																			1					
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOFALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
RE-ALIGN TAXIWAY N - DAYS																									
Bulldozer - Small	35																						1	1	
Bulldozer - Large	30																						1		
Excavators - Small																									
Excavators - Medium	30																						1		
Excavators - Large																									
Front End Loaders - Large	30																						1		
Graders - Small	30																							1	
Graders - Large	30																						1		
Dump Trucks - Small	35																						2	2	
Dump Trucks - Large	40																						14	4	
Trailer Dump Trucks - Large	40																						6		
Vibratory Compactors - Large	40																						6		
Plate Compactors - Small	15																						2		
Static Compactors - Large	35																						1		
Water Trucks	25																						2	1	
Backhoes - Small	50																						1	1	
Backhoes - Large	40																						1	1	
Stake Bed Trucks - Small	10																						1	1	
Stake Bed Trucks - Medium	10																						1	1	
Stake Bed Trucks - Large	10																						1		
Pick Up Trucks - Small	35																						8	4	
Flatbed Trucks for Equipment Transport	5																						2	1	
Sweepers - Small	90																						2		
Sweepers - Large	90																						4	2	
Air Compressors W/Tools - Small																									
Air Compressors W/Tools - Medium	35																						2		
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium																									
Electrical Generators W/Power Tools	15																						2		
Paving Machine - Large	40																						1		
Pavement Saw - Large	15																						1		
Core Drill Machine	15																						1		
Liquid Ashphalt Tanker Trucks	15																						1		
Pavement Milling Machines - Small																									
Pavement Milling Machines - Medium																									
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large																									
Mobile Cranes - Small																									
Mobile Cranes - Medium	15																						1		
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

		NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
EQUIPMENT SOURCE	U.F.(%)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
RE-ALIGN TAXIWAY N - NIGHTS (10:00 p.m. - 6:00 a.m.)																									
Bulldozer - Small	30																						1	1	
Bulldozer - Large	30																						1		
Excavators - Small																									
Excavators - Medium	40																						2		
Excavators - Large																									
Front End Loaders - Large	40																						1	1	
Graders - Small																									
Graders - Large	30																						1		
Dump Trucks - Small	60																						2	2	
Dump Trucks - Large	60																						16	14	
Trailer Dump Trucks - Large	60																						4	4	
Vibratory Compactors - Large	50																						4	4	
Plate Compactors - Small	20																						2	2	
Static Compactors - Large	50																						1	1	
Water Trucks	30																						2	2	
Backhoes - Small	60																						2	1	
Backhoes - Large	50																						1	1	
Stake Bed Trucks - Small	20																						1	1	
Stake Bed Trucks - Medium	20																						1		
Stake Bed Trucks - Large	20																						1	1	
Pick Up Trucks - Small	35																						8	6	
Flatbed Trucks for Equipment Transport	5																						2	1	
Sweepers - Small	90																						2	2	
Sweepers - Large	90																						4	4	
Air Compressors W/Tools - Small	20																						1		
Air Compressors W/Tools - Medium	20																						2	2	
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium	90																						16	16	
Electrical Generators W/Power Tools	40																						2	2	
Paving Machine - Large	70																						1	1	
Pavement Saw - Large	20																						2	2	
Core Drill Machine	20																						1	1	
Liquid Ashphalt Tanker Trucks	20																						1	1	
Pavement Milling Machines - Small	10																						1	1	
Pavement Milling Machines - Medium	20																						1	1	
Pavement Milling Machines - Large																									
Vermeer Trenching Machine - Large	10																						1		
Mobile Cranes - Small																									
Mobile Cranes - Medium	20																						1		
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SUMMARY - DAYS																									
Bulldozer - Small						4	2	2	2		2	2	2				1		1	1			1	1	
Bulldozer - Large						7	2				4	4							2	1			1		
Excavators - Small											4								1	1					
Excavators - Medium						3	2	2			3	3				1			2	1			1		
Excavators - Large						4	1				2														
Front End Loaders - Large						6	2	2	1		4	4				1			2	2			1		
Graders - Small							1	1	1		4		2				1							1	
Graders - Large						2	2	1	1			2							1	1			1		
Dump Trucks - Small						6	4	2	2		2	2	4			2	2		4	2			2	2	
Dump Trucks - Large						35	25	20	5		12	25	10			3	2		25	18			14	4	
Trailer Dump Trucks - Large						20	16	10	2		8	16	4						6	4			6		
Vibratory Compactors - Large						6	6	6	2		8	12	8			1			6	4			6		
Plate Compactors - Small						4	4	4			4	4	2			2	2		4	2			2		
Static Compactors - Large						2	2	2				2	1						2	1			1		
Water Trucks						5	3	3	1		2	2	2			1	1		2	2			2	1	
Backhoes - Small							2	2	1			2	2			1	2		3	2			1	1	
Backhoes - Large						4	2	1			2	2				1			1				1	1	
Stake Bed Trucks - Small						2	2	2	2				2			1			1	1			1	1	
Stake Bed Trucks - Medium						4			1		4	4	1				2		1	1			1	1	
Stake Bed Trucks - Large						4	2	2				2	2						1	1			1		
Pick Up Trucks - Small						18	14	8	6		6	8	6			8	6		8	8			8	4	
Flatbed Trucks for Equipment Transport						3	2	2			2	3	2			1	1		2	2			2	1	
Sweepers - Small						2	2	2	1		2	2	2			2	1		2	2			2		
Sweepers - Large						6	4	4	2		2	4	2			2	1		4	4			4	2	
Air Compressors W/Tools - Small							1	1											1	1					
Air Compressors W/Tools - Medium						4	2	2	1		2	4	2			2			3	2			2		
Air Compressors W/Tools - Large						3	2																		
Light Towers(generator powered) - Medium						16																			
Electrical Generators W/Power Tools						12	18	6	2							2			2	2			2		
Paving Machine - Large						2	2	2				2	1						1	1			1		
Pavement Saw - Large						2	2	2															1		
Core Drill Machine						1	1	1				1	1						1	1			1		
Liquid Ashphalt Tanker Trucks						1	1	1				1	1						1	1			1		
Pavement Milling Machines - Small						1	1	1																	
Pavement Milling Machines - Medium						1		1																	
Pavement Milling Machines - Large							1																		
Vermeer Trenching Machine - Large						1	1	1								1									
Mobile Cranes - Small																									
Mobile Cranes - Medium						1	1				2					1			1	1			1		
Mobile Cranes - Large						1																			
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small						1																			
Backhoes W/Hoe Rams - Large						2																			
Cutting Torches						6																			
Demolition Hammers						2																			

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- USES NORTH GATE FOF ALL OTHER QUARTERS WILL USE SOUTH OF CONSTRUCTION GATE TO GAIN ACCESS

EQUIPMENT SOURCE	U.F.(%)	NUMBER OF PIECES OF EQUIPMENT ON SITE PER CONSTRUCTION QUARTER																							
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				YEAR 6			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SUMMARY - NIGHTS (10:00 p.m. - 6:00 a.m.)																									
Bulldozer - Small							1					2					1			1			1	1	
Bulldozer - Large							2					4											1		
Excavators - Small															1										
Excavators - Medium							2					3			1					1			2		
Excavators - Large																									
Front End Loaders - Large							2					4			2	1	1			1			1	1	
Graders - Small							1								1		1			1					
Graders - Large							1					2											1		
Dump Trucks - Small							2					2			2		2			2			2	2	
Dump Trucks - Large							25					25			14	10	12			14			16	14	
Trailer Dump Trucks - Large							16					16			6	4	4			4			4	4	
Vibratory Compactors - Large							6					12			6	4	4			4			4	4	
Plate Compactors - Small							4					4			2	2	2			2			2	2	
Static Compactors - Large							2					2			2	2	2			1			1	1	
Water Trucks							2					2			2	1	2			2			2	2	
Backhoes - Small							2					2			1	1	2			1			2	1	
Backhoes - Large															1					1			1	1	
Stake Bed Trucks - Small							2					4			2	2	2			1			1	1	
Stake Bed Trucks - Medium												2			1		2			1			1		
Stake Bed Trucks - Large							2					8			1	1	1			1			1	1	
Pick Up Trucks - Small							8					3			8	6	8			8			8	6	
Flatbed Trucks for Equipment Transport							2					2			2	1	1			2			2	1	
Sweepers - Small							2					2			2	2	2			2			2	2	
Sweepers - Large							4					4			4	4	4			4			4	4	
Air Compressors W/Tools - Small															1	1	1						1		
Air Compressors W/Tools - Medium							2					4			2	2	2			2			2	2	
Air Compressors W/Tools - Large																									
Light Towers(generator powered) - Medium							12					15			16	16	16			12			16	16	
Electrical Generators W/Power Tools							6					8			6	4	4			4			2	2	
Paving Machine - Large							2					2			1	1	1			1			1	1	
Pavement Saw - Large							2					2			2	2	2			2			2	2	
Core Drill Machine							1					1			1	1	1			1			1	1	
Liquid Ashphalt Tanker Trucks							1					1			1	1	1			1			1	1	
Pavement Milling Machines - Small							1					1			1	1	1			1			1	1	
Pavement Milling Machines - Medium							1					2			1	1	1			1			1	1	
Pavement Milling Machines - Large							1																		
Vermeer Trenching Machine - Large							1					1			1					1			1		
Mobile Cranes - Small																									
Mobile Cranes - Medium												1			1					1			1		
Mobile Cranes - Large																									
Concrete Trucks - Large	VARIES																								
Backhoes W/Hoe Rams - Small																									
Backhoes W/Hoe Rams - Large																									
Cutting Torches																									
Demolition Hammers																									

Construction Noise

- USES NORTH GATE FOR ACCESS; ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

SOURCE Leq @ 50 FEET DAY		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						93.8	94.6	91.1												
	2						93.8	94.6	91.1												
	3						93.8	94.6	91.1												
Midfield Taxiway North																					
	1						93.8	94.6	91.1												
Runway 14-32																					
	1	94.2	93.8	95.3	93.8																
	2	94.2	93.8	95.3	93.8																
	3	94.2	93.8	95.3	93.8																
Southwest Taxiways																					
	1											92.2	92.2								
Delta Taxiway Extension																					
	1														97.5	94.2					
November Taxiway																					
	1																		94.4	94.1	

SOURCE Leq @ 50 FEET NIGHT		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1							91.9													
	2							91.9													
	3							91.9													
Midfield Taxiway North																					
	1							91.9													
Runway 14-32																					
	1		92.8																		
	2		92.8																		
	3		92.8																		
Southwest Taxiways																					
	1										96.4	96.3	96.3								
Delta Taxiway Extension																					
	1															95.2					
November Taxiway																					
	1																		96.0	96.5	

SOURCE LDN @ 50 FEET		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
Position						N				N				N				N			
Midfield Taxiway South						O				O				O				O			
1							91.5	98.4	88.8												
2						W	91.5	98.4	88.8	W				W				W			
3						O	91.5	98.4	88.8	O				O				O			
						R				R				R				R			
Midfield Taxiway North						K				K				K				K			
1							91.5	98.4	88.8												
						W				W				W				W			
Runway 14-32						I				I				I				I			
1		91.9	98.9	93.0	91.5	N				N				N				N			
2		91.9	98.9	93.0	91.5	T				T				T				T			
3		91.9	98.9	93.0	91.5	E				E				E				E			
						R				R				R				R			
Southwest Taxiways																					
1						S				S	101.6	101.8	101.8	S				S			
						H				H				H				H			
Delta Taxiway Extension						U				U				U				U			
1						T				T				T	95.2	101.0		T			
						D				D				D				D			
November Taxiway						O				O				O				O			
1						W				W				W				W	101.7	102.1	
						N				N				N				N			

NUMBER OF DAILY TRUCK TRIPS		Ldn																			
		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Day	61	43	61	61	0	92	46	92	0	0	5	5	0	47	38	0	0	28	28	
	Night	0	18	0	0	0	0	46	0	0	18	13	13	0	0	9	0	0	28	28	
SOURCE DISTANCES IN FEET		RECEIVER POSITIONS																			
		6	7	10	12	C(E1)	A(B1)	14	E												
CONSTRUCTION PROJECT																					
Position																					
Midfield Taxiway South																					
1		7800	8700	10680	9240	9000	6380	5280	8500												
2		5820	6420	8220	6900	6960	6180	5220	10700												
3		4200	4200	5880	4800	5040	6840	6180	13000												
Midfield Taxiway North																					
1		3720	2400	3480	3180	3900	8220	9600	15800												
Runway 14-32																					
1		9400	10080	11580	9600	9300	4980	3900	7400												
2		9000	10020	12000	10440	10200	6780	5700	7000												
3		9000	10320	12600	11400	11400	8580	7500	6900												
Southwest Taxiways																					
1		7560	8220	9960	8400	8100	5580	4620	9000												
Delta Taxiway Extension																					
1		5400	7140	8880	8280	8400	8040	7080	10500												
November Taxiway																					
1		4980	4440	5340.0	3840.0	3960.0	6180.0	5700.0	13700.0												
Nearest Perimeter Roads 6		9500	9500	9500	9500		3600	3600	3600	W	8800	8800	8800	W	5500	5500		W	5000	5000	
7		10300	10300	10300	10300		2100	2100	2100	N	9300	9300	9300	N	7500	7500		N	4000	4000	
10		12000	12000	12000	12000		1800	1800	1800	W	10600	10600	10600	W	10000	10000		W	5000	5000	
12		9300	9300	9300	9300		1800	1800	1800	W	8300	8300	8300	W	8400	8400		W	2520	2520	
C		8800	8800	8800	8800		1680	1680	1680	N	8000	8000	8000	N	8500	8500		N	2520	2520	
A		3000	3000	3000	3000		5300	5300	5300		5000	5000	5000		3000	3000			5300	5300	
14		2100	2100	2100	2100		5300	5300	5300		4500	4500	4500		2100	2100			5300	5300	
E		6500	6500	6500	6500		12300	12300	12300		8300	8300	8300		6500	6500			12300	12300	

ATTENUATION		RECEIVER POSITIONS							
		6	7	10	12	C(E1)	A(B1)	14	E
CONSTRUCTION PROJECT									
Position									
Midfield Taxiway South									
1							0.0	7.0	
2							12.0	12.0	
3							9.0	12.0	
Midfield Taxiway North									
1							0.0	6.0	
Runway 14-32									
1							0.0	0.0	
2							5.0	7.0	
3							5.0	7.0	
Southwest Taxiways									
1							4.0	8.0	
Delta Taxiway Extension									
1							5.0	10.0	
November Taxiway									
1							5.0	7.0	
Nearest Perimeter Roads									
1							0.0	0.0	

- USES NORTH GATE FOR ACCESS; ALL OTHER QUARTERS WILL USE SOUTH OR CONSTRUCTION GATE TO GAIN ACCESS

Leq DAY RECEIVING POSITION NMS 6		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						48.6	49.4	45.9												
	2						51.3	52.1	48.6												
	3						54.4	55.2	51.7												
Total							56.8	57.6	54.1												
Midfield Taxiway North																					
	1						55.5	56.3	52.8												
Runway 14-32																					
	1	44.9	52.0	46.0	44.5																
	2	45.3	52.4	46.4	44.9																
	3	45.3	52.4	46.4	44.9																
Total		50.0	57.0	51.1	49.6																
Southwest Taxiways																					
	1											47.3	47.3								
Delta Taxiway Extension																					
	1														55.7	52.4					
November Taxiway																					
	1																		53.4	53.1	
Truck Trips																					
Day	1	34.9	33.4	34.9	34.9		41.5	38.5	41.5			24.4	24.4		36.5	35.5			34.7	34.7	
	2																				
Total Trucks		34.9	33.4	34.9	34.9		41.5	38.5	41.5			24.4	24.4		36.5	35.6			34.7	34.7	
Total for All Activity		50.1	57.0	51.2	49.7		59.3	60.1	56.7			47.3	47.3		55.8	52.5			53.4	53.2	

Leq DAY RECEIVING POSITION NMS 7		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						47.6	48.4	44.9												
	2						50.4	51.2	47.7												
	3						54.4	55.2	51.7												
Total							56.4	57.2	53.7												
Midfield Taxiway North																					
	1						59.6	60.4	56.9												
Runway 14-32																					
	1	46.6	46.2	47.7	46.2																
	2	46.7	46.3	47.8	46.3																
	3	46.4	46.0	47.5	46.0																
Total		51.3	50.9	52.4	50.9																
Southwest Taxiways																					
	1											46.5	46.5								
Delta Taxiway Extension																					
	1														55.7	49.8					
November Taxiway																					
	1																		54.5	54.2	
Truck Trips																					
Day	1	34.5	33.0	34.5	34.5		44.2	41.2	44.2			24.1	24.1		34.9	34.0			35.8	35.8	
	2																				
Total Trucks		34.5	33.0	34.5	34.5		44.2	41.2	44.2			24.1	24.1		34.9	34.0			35.8	35.8	
Total for All Activity		51.4	51.0	52.5	51.0		61.4	62.2	58.8			46.5	46.5		55.8	49.9			54.5	54.2	

Leq DAY RECEIVING POSITION NMS 10		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						45.7	46.5	43.0												
	2						48.1	48.9	45.4												
	3						51.2	52.0	48.5												
Total							53.7	54.5	51.0												
Midfield Taxiway North																					
	1						56.1	56.9	53.4												
Runway 14-32																					
	1	45.3	44.9	46.4	44.9																
	2	45.0	44.6	46.1	44.6																
	3	44.5	44.1	45.6	44.1																
Total		49.7	49.3	50.8	49.3																
Southwest Taxiways																					
	1											44.7	44.7								
Delta Taxiway Extension																					
	1														51.1	47.8					
November Taxiway																					
	1																		52.7	52.4	
Truck Trips																					
Day	1	33.7	32.2	33.7	33.7		45.0	42.0	45.0			23.5	23.5		33.5	32.6			34.7	34.7	
	2																				
Total Trucks		33.7	32.2	33.7	33.7		45.0	42.0	45.0			23.5			33.5	32.6			34.7	34.7	
Total for All Activity		49.8	49.4	50.9	49.4		58.3	59.0	55.8			44.7	44.7		51.2	47.9			52.8	52.5	

Leq DAY RECEIVING POSITION NMS 12		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						47.0	47 8	44.3												
	2						49.7	50.5	47.0												
	3						53.1	53.9	50.4												
Total							55.4	56.2	52.7												
Midfield Taxiway North																					
	1						57.0	57.8	54.3												
Runway 14-32																					
	1	47.1	46.7	48.2	46.7																
	2	46.3	45.9	47.4	45.9																
	3	45.5	45.1	46.6	45 1																
Total		51.1	50.7	52.2	50.7																
Southwest Taxiways																					
	1											46.3	46.3								
Delta Taxiway Extension																					
	1														51.7	48.4					
November Taxiway																					
	1																		55.8	55.5	
Truck Trips																					
Day	1	35.0	33.5	35.0	35.0		45.0	42.0	45.0			24.7	24 7		34.4	33.4			38 1	38 1	
	2																				
Total Trucks		35.0	33.5	35.0	35.0		45.0	42.0	45.0			24.7	24 7		34.4	33.4			38.1	38 1	
Total for All Activity		51.2	50.8	52.3	50.8		59.4	60.2	56.9			46.3	46.3		51.8	48.6			55.9	55 6	

Leq DAY RECEIVING POSITION C (E1)		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						47.3	48.1	44.6												
	2						49.7	50.5	47.0												
	3						52.7	53.5	50.0												
Total							55.2	56.0	52.5												
Midfield Taxiway North																					
	1						55.1	55.9	52.4												
Runway 14-32																					
	1	47.4	47.0	48.5	47.0																
	2	46.5	46.1	47.6	46.1																
	3	45.5	45.1	46.6	45.1																
Total		51.3	50.9	52.4	50.9																
Southwest Taxiways																					
	1											46.6	46.6								
Delta Taxiway Extension																					
	1														51.6	48.3					
November Taxiway																					
	1																		55.5	55.2	
Truck Trips																					
Day	1	35.3	33.7	35.3	35.3		45.3	42.3	45.3			24.9	24.9		34.3	33.4			38.1	38.1	
	2																				
Total Trucks		35.3	33.7	35.3	35.3		45.3	42.3	45.3			24.9	24.9		34.3	33.4			38.1	38.1	
Total for All Activity		51.4	51.0	52.5	51.0		58.4	59.0	55.8			46.7	46.7		51.7	48.4			55.6	55.3	

Leq DAY RECEIVING POSITION A (B1)		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						50.5	51.3	47.8												
	2						38.8	39.6	36.1												
	3						40.8	41.6	38.1												
Total							51.2	52.0	48.5												
Midfield Taxiway North																					
	1						48.1	48.9	45.4												
Runway 14-32																					
	1	53.2	52.8	54.3	52.8																
	2	50.3	49.9	51.4	49.9																
	3	48.1	47.7	49.2	47.7																
Total		55.8	55.4	56.9	55.4																
Southwest Taxiways																					
	1											46.1	46.1								
Delta Taxiway Extension																					
	1														47.0	43.7					
November Taxiway																					
	1																		46.4	46.1	
Truck Trips																					
Day	1	40.6	39.1	40.6	40.6		39.6	36.6	39.6			27.2	27.2		39.5	38.6			34.4	34.4	
	2																				
Total Trucks		40.6	39.1	40.6	40.6		39.6	36.6	39.6			27.2	27.2		39.5	38.6			34.4	34.4	
Total for All Activity		55.9	55.5	57.0	55.5		53.1	53.8	50.6			46.2	46.2		47.7	44.9			46.6	46.4	

Leq DAY RECEIVING POSITION NMS 14		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						52.2	53.0	49.5												
	2						40.3	41.1	37.6												
	3						38.8	39.6	36.1												
Total							52.7	53.5	50.0												
Midfield Taxiway North																					
	1						40.7	41.5	38.0												
Runway 14-32																					
	1	55.5	55.1	56.6	55.1																
	2	51.9	51.5	53.0	51.5																
	3	49.4	49.0	50.5	49.0																
Total		57.7	57.3	58.8	57.3																
Southwest Taxiways																					
	1											43.9	43.9								
Delta Taxiway Extension																					
	1														43.2	39.9					
November Taxiway																					
	1																		45.1	44.8	
Truck Trips																					
Day	1	42.4	40.9	42.4	42.4		39.6	36.6	39.6			27.7	27.7		41.3	40.4			34.4	34.4	
	2																				
Total Trucks		42.4	40.9	42.4	42.4		39.6	36.6	39.6			27.8	27.8			40.4			34.4	34.4	
Total for All Activity		57.9	57.4	58.9	57.5		53.2	53.8	50.6			44.0	44.0		43.2	43.1			45.5	45.2	

Leq DAY RECEIVING POSITION E		2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
CONSTRUCTION PROJECT																					
	Position																				
Midfield Taxiway South																					
	1						47.8	48.6	45.1												
	2						45.6	46.4	42.9												
	3						43.8	44.6	41.1												
Total							50.8	51.6	48.1												
Midfield Taxiway North																					
	1						42.0	42.8	39.3												
Runway 14-32																					
	1	49.5	49.1	50.6	49.1																
	2	50.0	49.6	51.1	49.6																
	3	50.1	49.7	51.2	49.7																
Total		54.7	54.3	55.8	54.3																
Southwest Taxiways																					
	1											45.7	45.7								
Delta Taxiway Extension																					
	1														49.5	46.2					
November Taxiway																					
	1																		43.9	43.6	
Truck Trips																					
Day	1	36.8	35.3	36.8	36.8		35.4	32.4	35.4			24.7	24.7		35.6	34.7			30.2	30.2	
	2																				
Total Trucks		36.8	35.3	36.8	36.8		35.4	32.4	35.4			24.7	24.7			34.7			30.2	30.2	
Total for All Activity		54.7	54.3	55.8	54.3		51.5	52.2	48.9			45.7	45.7		49.5	46.5			44.1	43.8	

AIRSIDE CONSTRUCTION NOISE		Leq DAY in Decibels				All Projects															
RECEIVING POSITION	ACTIVITY	2003				2004				2005				2006				2007			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
NMS 6																					
	Construction	50.1	57.0	51.2	49.7	0.0	59.3	60.1	56.7	0.0	0.0	47.3	47.3	0.0	55.8	52.5	0.0	0.0	53.4	53.2	0.0
	Ambient	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3	64.3
	Total	64.5	65.1	64.5	64.5	64.3	65.5	65.7	65.0	64.3	64.3	64.4	64.4	64.3	64.9	64.6	64.3	64.3	64.7	64.7	64.3
NMS 7																					
	Construction	51.4	51.0	52.5	51.0	0.0	61.4	62.2	58.8	0.0	0.0	46.5	46.5	0.0	55.8	49.9	0.0	0.0	54.5	54.2	0.0
	Ambient	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3	72.3
	Total	72.3	72.3	72.3	72.3	72.3	72.6	72.7	72.5	72.3	72.3	72.3	72.3	72.3	72.4	72.3	72.3	72.3	72.3	72.3	72.3
NMS 10																					
	Construction	49.8	49.4	50.9	49.4	0.0	58.3	59.0	55.8	0.0	0.0	44.7	44.7	0.0	51.2	47.9	0.0	0.0	52.8	52.5	0.0
	Ambient	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7	63.7
	Total	63.9	63.8	63.9	63.8	63.7	64.8	64.9	64.3	63.7	63.7	63.7	63.7	63.7	63.9	63.8	63.7	63.7	64.0	64.0	63.7
NMS 12																					
	Construction	51.2	50.8	52.3	50.8	0.0	59.4	60.2	56.9	0.0	0.0	46.3	46.3	0.0	51.8	48.6	0.0	0.0	55.9	55.6	0.0
	Ambient	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6
	Total	67.7	67.7	67.7	67.7	67.6	68.2	68.3	67.9	67.6	67.6	67.6	67.6	67.6	67.7	67.6	67.6	67.6	67.9	67.9	67.6
POS C																					
	Construction	51.4	51.0	52.5	51.0	0.0	58.4	59.0	55.8	0.0	0.0	46.7	46.7	0.0	51.7	48.4	0.0	0.0	55.6	55.3	0.0
	Ambient	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5	66.5
	Total	66.7	66.6	66.7	66.6	66.5	67.1	67.2	66.9	66.5	66.5	66.6	66.6	66.5	66.7	66.6	66.5	66.5	66.9	66.8	66.5
POS A																					
	Construction	55.9	55.5	57.0	55.5	0.0	53.1	53.8	50.6	0.0	0.0	46.2	46.2	0.0	47.7	44.9	0.0	0.0	46.6	46.4	0.0
	Ambient	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2	59.2
	Total	60.9	60.7	61.2	60.7	59.2	60.1	60.3	59.7	59.2	59.2	59.4	59.4	59.2	59.5	59.3	59.2	59.2	59.4	59.4	59.2
NMS 14																					
	Construction	57.9	57.4	58.9	57.5	0.0	53.2	53.8	50.6	0.0	0.0	44.0	44.0	0.0	43.2	43.1	0.0	0.0	45.5	45.2	0.0
	Ambient	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2
	Total	62.9	62.7	63.2	62.7	61.2	61.8	61.9	61.6	61.2	61.2	61.3	61.3	61.2	61.3	61.3	61.2	61.2	61.3	61.3	61.2
POS E																					
	Construction	54.7	54.3	55.8	54.3	0.0	51.5	52.2	48.9	0.0	0.0	45.7	45.7	0.0	49.5	46.5	0.0	0.0	44.1	43.8	0.0
	Ambient	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9	59.9
	Total	61.0	60.9	61.3	60.9	59.9	60.5	60.6	60.2	59.9	59.9	60.0	60.0	59.9	60.3	60.1	59.9	59.9	60.0	60.0	59.9

Annual Construction-Related Air Emissions, 2002-2006

Annual Construction-related Air Emissions – 2002

Construction Equipment	Usage (hrs)	Emissions (lbs) VOCs	CO	NOx	PM
Air Compressors <50 hp	2,860.0	942.86	21,313.72	25.74	6.99
Bore/Drill Rigs	1,092.0	150.95	377.37	2,577.80	150.95
Concrete/Industrial Saws	1,664.0	842.17	13,994.08	71.42	8.18
Cranes	520.0	38.25	95.63	653.27	38.25
Crushing/Processing Equipment	1,326.0	115.83	289.59	1,978.16	115.83
Excavators	5,408.0	497.46	1,243.65	8,495.35	497.46
Generator Sets <50 hp	3,744.0	1,826.29	41,409.51	222.39	13.58
Graders	2,236.0	206.88	517.21	3,533.04	206.88
Paving Equipment	2,808.0	608.24	9,618.34	49.09	5.62
Plate Compactors	12,636.0	1,832.47	28,820.10	147.09	16.85
Rubber Tired Dozer	8,632.0	1,199.14	3,997.13	17,807.19	1,598.85
Signal Boards & Light Plants	2,808.0	48.73	170.56	179.70	22.84
Sweepers/Scrubbers	10,764.0	1,095.69	1,565.27	10,692.34	1,126.99
Tractor/Loader/Backhoe	18,252.0	1,192.88	1,704.11	11,640.79	1,226.96
Trenchers	1,144.0	79.45	113.49	775.28	81.72
Concrete & Dump Trucks	24,856.0	2,186.44	12,050.10	8,219.71	704.43
Delivery/Haul Trucks	2,860.0	251.58	1,386.52	945.78	81.05
Water Trucks	3,120.0	343.58	3,205.69	393.10	0.00
Pick-up Trucks	6,500.0	335.32	3,172.67	277.29	10.10
Paving Emissions	0	26,174.21	0	0	0
Fugitive Dust Emissions[1]	0	0	0	0	19,282.70
	(lbstyr):	**39,968.43**	**145,044.73**	**68,684.53**	**25,196.26**
Total	**(tonslyr):** [2]	**19.98**	**72.52**	**34.34**	**12.60**
	(kg/day):	**49.67**	**180.25**	**85.36**	**31.31**

[1] This total represents fugitive dust emissions with no control measures. Control measures such as application of water and use of silt fences will reduce this total substantially.

[2] The *de minimis* values are 50 tons per year (tpy) for VOCs and NOx and 100 tpy for CO.

Annual Construction-related Air Emissions – 2003

Construction Equipment	Usage (hrs)	Emissions (lbs) VOCs	CO	NOx	PM
Air Compressors <50 hp	1,508.0	497.15	11,238.14	13.57	3.69
Bore/Drill Rigs	936.0	129.38	323.46	2,209.54	129.38
Concrete/Industrial Saws	624.0	315.82	5,247.78	26.78	3.07
Cranes	624.0	45.90	114.76	783.92	45.90
Crushing/Processing Equipment	1,040.0	90.85	227.13	1,551.49	90.85
Excavators	5,148.0	473.54	1,183.86	8,086.92	473.54
Generator Sets <50 hp	2,704.0	1,318.99	29,906.87	160.62	9.81
Graders	3,354.0	310.32	775.81	5,299.56	310.32
Paving Equipment	2,080.0	450.55	7,124.70	36.36	4.17
Plate Compactors	9,256.0	1,342.31	21,111.02	107.74	12.35
Rubber Tired Dozer	5,044.0	700.70	2,335.67	10,405.41	934.27
Signal Boards & Light Plants	2,808.0	48.73	170.56	179.70	22.84
Sweepers/Scrubbers	7,488.0	762.22	1,088.88	7,438.15	784.00
Tractor/Loader/Backhoe	6,240.0	407.82	582.60	3,979.76	419.47
Trenchers	494.0	34.31	49.01	334.78	35.29
Concrete & Dump Trucks	30,628	2,643.53	14,787.58	9,672.70	795.09
Delivery/Haul Trucks	936	80.79	451.91	295.60	24.30
Water Trucks	2,392	251.54	2,319.27	290.30	0.00
Pick-up Trucks	4,420	220.71	2,129.65	182.71	6.87
Paving Emissions	0	48,683.66	0	0	0
Fugitive Dust Emissions[1]	0	0	0	0	35,865.58
	(lbstyr):	**58,808.82**	**101,168.64**	**51,055.62**	**39,970.78**
Total	**(tonslyr):** [2]	**29.40**	**50.58**	**25.53**	**19.99**
	(kg/day):	**73.08**	**125.72**	**63.45**	**49.67**

[1] This total represents fugitive dust emissions with no control measures. Control measures such as application of water and use of silt fences will reduce this total substantially.

[2] The *de minimis* values are 50 tons per year (tpy) for VOCs and NOx and 100 tpy for CO.

Annual Construction-related Air Emissions – 2004

Construction Equipment	Usage (hrs)	Emissions (lbs)			
		VOCs	CO	NOx	PM
Air Compressors <50 hp	1,352.0	445.72	10,075.58	12.17	3.30
Bore/Drill Rigs	468.0	64.69	161.73	720.50	64.69
Concrete/Industrial Saws	624.0	315.82	5,247.78	26.78	3.07
Cranes	676.0	49.73	124.32	553.86	49.73
Crushing/Processing Equipment	780.0	68.14	170.34	758.88	68.14
Excavators	1,872.0	172.20	430.49	1,917.85	172.20
Generator Sets <50 hp	2,600.0	1,268.26	28,756.60	154.44	9.43
Graders	1,092.0	101.04	252.59	1,125.29	101.04
Paving Equipment	1,248.0	270.33	4,274.82	21.82	2.50
Plate Compactors	5,460.0	791.81	12,453.13	63.56	7.28
Rubber Tired Dozer	780.0	108.36	361.19	1,609.08	144.47
Signal Boards & Light Plants	8,424.0	146.20	511.69	539.10	68.53
Sweepers/Scrubbers	7,020.0	714.58	1,020.83	6,973.27	735.00
Tractor/Loader/Backhoe	3,588.0	234.50	335.00	2,288.36	241.20
Trenchers	676.0	46.95	67.06	458.12	48.29
Concrete & Dump Trucks	5,460	464.04	2,628.93	1,661.14	131.63
Delivery/Haul Trucks	1,040	88.39	500.75	316.41	25.07
Water Trucks	2,028	205.22	1,801.36	236.07	0.00
Pick-up Trucks	5,148	251.96	2,451.47	207.69	7.83
Paving Emissions	0	54,965.90	0	0	0
Fugitive Dust Emissions[1]	0	0	0	0	40,493.76
	(lbstyr):	**58,808.82**	**101,168.64**	**51,055.62**	**39,970.78**
Total	**(tonslyr):**[2]	**29.40**	**50.58**	**25.53**	**19.99**
	(kg/day):	**73.08**	**125.72**	**63.45**	**49.67**

[1] This total represents fugitive dust emissions with no control measures. Control measures such as application of water and use of silt fences will reduce this total substantially.

[2] The *de minimis* values are 50 tons per year (tpy) for VOCs and NOx and 100 tpy for CO.

Annual Construction-related Air Emissions – 2005

Construction Equipment	Usage (hrs)	Emissions (lbs) VOCs	CO	NOx	PM
Air Compressors <50 hp	364.0	120.00	2,712.65	3.28	0.89
Bore/Drill Rigs	208.0	28.75	71.88	320.22	28.75
Concrete/Industrial Saws	728.0	368.45	6,122.41	31.25	3.58
Cranes	156.0	11.48	28.69	127.81	11.48
Crushing/Processing Equipment	208.0	18.17	45.43	202.37	18.17
Generator Sets <50 hp	832.0	405.84	9,202.11	49.42	3.02
Graders	364.0	33.68	84.20	375.10	33.68
Paving Equipment	1,092.0	236.54	3,740.47	19.09	2.19
Plate Compactors	4,888.0	708.86	11,148.51	56.90	6.52
Rubber Tired Dozer	884.0	122.80	409.34	1,823.63	163.74
Signal Boards & Light Plants	2,808.0	48.73	170.56	179.70	22.84
Sweepers/Scrubbers	4,212.0	428.75	612.50	4,183.96	441.00
Tractor/Loader/Backhoe	1,326.0	86.66	123.80	845.70	89.14
Trenchers	52.0	3.61	5.16	35.24	3.71
Concrete & Dump Trucks	10,088	854.02	4,830.58	2,975.74	224.52
Delivery/Haul Trucks	364	30.82	174.30	107.37	8.10
Water Trucks	1,092	107.97	934.57	122.42	0.00
Pick-up Trucks	2,808	135.57	1,351.09	112.36	4.27
Paving Emissions	0	10,469.95	0	0	0
Fugitive Dust Emissions[1]	0	0	0	0	7,713.29
Total	**(lbstyr):**	**14,220.66**	**41,768.26**	**11,571.55**	**8,778.88**
	(tonslyr): [2]	**7.11**	**20.88**	**5.79**	**4.39**
	(kg/day):	**17.67**	**51.91**	**14.38**	**10.91**

[1] This total represents fugitive dust emissions with no control measures. Control measures such as application of water and use of silt fences will reduce this total substantially.

[2] The *de minimis* values are 50 tons per year (tpy) for VOCs and NOx and 100 tpy for CO.

Annual Construction-related Air Emissions – 2006

Construction Equipment	Usage (hrs)	Emissions (lbs) VOCs	CO	NOx	PM
Air Compressors <50 hp	572.0	188.57	4,262.74	5.15	1.40
Bore/Drill Rigs	364.0	50.32	125.79	560.39	50.32
Concrete/Industrial Saws	364.0	184.23	3,061.21	15.62	1.79
Cranes	364.0	26.78	66.94	298.23	26.78
Crush ing/Processing Equipment	208.0	18.17	45.43	202.37	18.17
Excavators	520.0	47.83	119.58	532.74	47.83
Generator Sets <50 hp	1,144.0	558.03	12,652.91	67.95	4.15
Graders	624.0	57.73	144.34	643.02	57.73
Paving Equipment	572.0	123.90	1,959.29	10.00	1.15
Plate Compactors	4,030.0	584.43	9,191.59	46.91	5.38
Rubber Tired Dozer	988.0	137.25	457.50	2,038.17	183.00
Signal Boards & Light Plants	5,616.0	97.46	341.13	359.40	45.69
Sweepers/Scrubbers	5,616.0	571.66	816.66	5,578.61	588.00
Tractor/Loader/Backhoe	2,808.0	183.52	262.17	1,790.89	188.76
Trenchers	104.0	7.22	10.32	70.48	7.43
Concrete & Dump Trucks	11,440	964.70	5,466.63	3,261.06	233.42
Delivery/Haul Trucks	520	43.85	248.48	148.23	10.61
Water Trucks	1,196	117.07	996.29	130.91	0.00
Pick-up Trucks	3,536	173.06	1,737.63	143.83	5.38
Paving Emissions	0	11,516.54	0	0	0
Fugitive Dust Emissions[1]	0	0	0	0	8,484.31
Total	**(lbstyr):**	**15,652.34**	**41,966.62**	**15,903.97**	**9,961.29**
	(tonslyr): [2]	**7.83**	**20.98**	**7.95**	**4.98**
	(kg/day):	**19.45**	**52.15**	**19.76**	**12.38**

[1] This total represents fugitive dust emissions with no control measures. Control measures such as application of water and use of silt fences will reduce this total substantially.

[2] The *de minimis* values are 50 tons per year (tpy) for VOCs and NOx and 100 tpy for CO.